This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

LANE MEDICAL LIBRARY STANFORD
2 45 0423 0375

U. S. DEPARTMENT OF AGRICULTURE.

DIVISION OF BOTANY.

PRINCIPAL POISONOUS PLANTS

OF

THE UNITED STATES.

BY

V. K. CHESNUT.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1898.

B1100
C51
1898
c. 2

LANE MEDICAL LIBRARY OF
STANFORD UNIVERSITY
300 PASTEUR ROAD
PALO ALTO, CALIFORNIA

LANE

MEDICAL LIBRARY

1885

LEVI COOPER LANE FUND

BULLETIN No. 20.

U. S. DEPARTMENT OF AGRICULTURE.
DIVISION OF BOTANY.

PRINCIPAL POISONOUS PLANTS

OF

THE UNITED STATES.

BY

V. K. CHESNUT.

LANE MEDICAL LIBRA
STANFORD UNIVERSITY
300 PASTEUR ROAD
PALO ALTO, CALIFORNIA

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1898.

LETTER OF TRANSMITTAL.

U. S. Department of Agriculture,
Division of Botany,
Washington, D. C., December 20, 1897.

Sir: I have the honor to transmit herewith for publication as a bulletin of this division a manuscript on the "Principal Poisonous Plants of the United States." In the annual report of the Botanist for 1894 was emphasized the importance of doing something to lessen the increasing number of fatal cases of poisoning due to carelessness or to a lack of correct knowledge of our poisonous plants, and as a result the Secretary of Agriculture, in November, 1894, appointed Mr. V. K. Chesnut as an assistant in the Division of Botany to take charge of such a line of work. In addition to the chemical and physiological investigations which have since been in progress, it has seemed desirable to distribute at once some simple but authoritative account of our commonest poisonous plants. In the prosecution of this work a novel method of securing correct information about actual cases of poisoning has been adopted. Through newspaper clipping bureaus the Division of Botany receives notices of all the cases of poisoning that are recorded in the principal newspapers. Then, through the persons mentioned by name in these articles or through the local postmaster, we get into correspondence with the physician in charge of the case, secure a specimen of the plant which is responsible for the poisoning, and place on file a complete record of the symptoms, treatment, and results. By this means we have secured a large amount of authentic and valuable information, additional to the published statements, the partial benefit of which is given to the people in this publication, and the remainder of which will be used from time to time in more detailed publications on the poisonous qualities of particular plants.

The plants which have been considered, about fifty in number, include most of the important poisonous species. Each is illustrated, wherever necessary, by an original drawing from authentic specimens, and is briefly described in a popular way. This, together with the liberal use of common names and a brief outline of the geographical distribution, will doubtless enable individuals in different localities to recognize any of the plants. For general educational purposes it has been thought best to follow the scientific classification.

3945

It is the purpose of the Division of Botany to collect statistics and general information relating to all of the poisonous plants of the United States, and so far as possible to examine into their chemical and physiological properties and to discover their antidotes. With this end in view, it is hoped that the heartiest cooperation will be received from all those who are able to render assistance.

Respectfully,
FREDERICK V. COVILLE,
Botanist.

Hon. JAMES WILSON,
Secretary of Agriculture.

CONTENTS.

Page.

- Introduction 9
- Gill fungi (Agaricaceae) 11
  - Deadly amanitas (Amanita) 11
    - Fly amanita (*Amanita muscaria*) (illustrated) 12
    - Death cup (*Amanita phalloides*) (illustrated) 14
- Bunch-flower family (Melanthaceae) 16
    - American false hellebore (*Veratrum viride*) (illustrated) 16
- Lily of the valley family (Convallariaceae) 18
    - Lily of the valley (*Convallaria majalis*) (illustrated) 18
- Orchid family (Orchidaceae) 19
  - Lady's slipper (Cypripedium) 19
    - Showy lady's slipper (*Cypripedium reginae*) (illustrated) 19
    - Larger yellow lady's slipper (*Cypripedium hirsutum*) (illustrated) 20
    - Smaller yellow lady's slipper (*Cypripedium parviflorum*) 20
- Pink family (Alsinaceae) 21
    - Corn cockle (*Agrostemma githago*) (illustrated) 21
- Crowfoot family (Ranunculaceae) 22
    - Aconite (*Aconitum columbianum*) (illustrated) 22
  - Larkspur (Delphinium) 23
    - Dwarf larkspur (*Delphinium tricorne*) (illustrated) 24
    - Larkspur (*Delphinium geyeri*) 24
    - Larkspur (*Delphinium menziesii*) 25
    - Larkspur (*Delphinium recurvatum*) 25
    - Larkspur (*Delphinium trolliifolium*) 25
- Plum family (Prunaceae) 26
    - Black cherry (*Prunus serotina*) (illustrated) 26
- Senna family (Caesalpiniaceae) 28
    - Kentucky coffee tree (*Gymnocladus dioica*) (illustrated) 28
- Pea family (Papilionaceae) 29
    - Woolly loco weed (*Astragalus mollissimus*) (illustrated) 29
    - Stemless loco weed (*Aragallus lambertii*) (illustrated) 30
    - Rattlebox (*Crotalaria sagittalis*) (illustrated) 31
- Spurge family (Euphorbiaceae) 32
  - Spurge (Euphorbia) 32
    - Caper spurge (*Euphorbia lathyris*) (illustrated) 33
    - Snow on the mountain (*Euphorbia marginata*) (illustrated) 34
- Sumac family (Anacardiaceae) 35
  - Poison ivy, poison oak, poison sumac (Rhus) 35
    - Poison ivy (*Rhus radicans*) (illustrated) 35
    - Poison oak (*Rhus diversiloba*) (illustrated) 36
    - Poison sumac (*Rhus vernix*) (illustrated) 36
- Buckeye family (Sapindaceae) 39
    - Red buckeye (*Aesculus pavia*) (illustrated) 39

Page.

Carrot family (Apiaceae) 40
  - Water hemlock (*Cicuta maculata*) .... (illustrated) .. 40
  - Oregon water hemlock (*Cicuta vagans*) .... (illustrated) .. 41
  - Poison hemlock (*Conium maculatum*) .... (illustrated) .. 43

Heath family (Ericaceae) 44
  - Broad-leaf laurel (*Kalmia latifolia*) .... (illustrated) .. 44
  - Narrow-leaf laurel (*Kalmia angustifolia*) .... (illustrated) .. 46
  - Great laurel (*Rhododendron maximum*) .... (illustrated) .. 47
  - Stagger bush (*Pieris mariana*) .... (illustrated) .. 48
  - Branch ivy (*Leucothöe catesbaei*) .... (illustrated) .. 48

Logania family (Loganiaceae) 48
  - False jessamine (*Gelsemium sempervirens*) .... (illustrated) .. 48

Potato family (Solanaceae) 48
  - Jimson weeds (Datura) 49
    - Jimson weed (*Datura stramonium*) .... (illustrated) .. 49
    - Jimson weed (*Datura tatula*) 50
  - Nightshades (Solanum) 51
    - Black nightshade (*Solanum nigrum*) .... (illustrated) .. 52
    - Bittersweet (*Solanum dulcamara*) .... (illustrated) .. 53
    - Spreading nightshade (*Solanum triflorum*) .... (illustrated) .. 53

Sunflower family (Carduaceae) 54
  - Sneezeweed (*Helenium autumnale*) .... (illustrated) .. 54

ILLUSTRATIONS.

Page.
FIG. 1. Fly amanita (*Amanita muscaria*) 12
2. Death cup (*Amanita phalloides*) 15
3. False hellebore (*Veratrum viride*) 17
4. Lily of the valley (*Convallaria majalis*) 18
5. Showy lady's slipper (*Cypripedium reginae*) 19
6. Larger yellow lady's slipper (*Cypripedium hirsutum*) 19
7. Corn cockle (*Agrostemma githago*) 21
8. Aconite (*Aconitum columbianum*) 23
9. Dwarf larkspur (*Delphinium tricorne*) 24
10. Black cherry (*Prunus serotina*) 27
11. Kentucky coffee tree (*Gymnocladus dioica*) 28
12. Woolly loco weed (*Astragalus mollissimus*) 29
13. Stemless loco weed (*Aragallus lambertii*) 30
14. Rattlebox (*Crotalaria sagittalis*) 31
15. Caper spurge (*Euphorbia lathyris*) 33
16. Snow on the mountain (*Euphorbia marginata*) 34
17. Poison ivy (*Rhus radicans*) 35
18. Poison oak (*Rhus diversiloba*) 36
19. Poison sumac (*Rhus vernix*) 37
20. Red buckeye (*Æsculus pavia*) 39
21. Water hemlock (*Cicuta maculata*) 40
22. Oregon water hemlock (*Cicuta vagans*) 41
23. Poison hemlock (*Conium maculatum*) 43
24. Broad-leaf laurel (*Kalmia latifolia*) 45
25. Narrow-leaf laurel (*Kalmia angustifolia*) 46
26. Great laurel (*Rhododendron maximum*) 46
27. Staggerbush (*Pieris mariana*) 47
28. Branch ivy (*Leucothöe catesbaei*) 48
29. False jessamine (*Gelsemium sempervirens*) 48
30. Jimson weed (*Datura stramonium*) 50
31. Black nightshade (*Solanum nigrum*) 52
32. Bittersweet (*Solanum dulcamara*) 53
33. Spreading nightshade (*Solanum triflorum*) 54
34. Sneezeweed (*Helenium autumnale*) 55

PRINCIPAL POISONOUS PLANTS OF THE UNITED STATES.

INTRODUCTION.

In view of the frequent results of ignorance with regard to poisonous plants, whether the occasional loss of human life, the large sacrifice of animals, and the consequent financial loss, or the annoyance and distress of countless minor cases of human poisoning, it is remarkable that no systematic treatise has been published concerning those that exist in the United States.

Statistics in regard to them are lacking on account of a general ignorance of the subject, and it is therefore impossible to form even an approximate estimate of the amount of damage done by them. The various species of water hemlock (Cicuta) kill a number of children each year. In the State of New Jersey two quadruple cases of water hemlock poisoning were reported during the spring of 1896, which resulted fatally to two of the eight individuals affected. The number of cattle killed by one species of Cicuta in Oregon alone is estimated to be over one hundred per annum. The number of deaths among cattle which are attributed to loco weed is very large, and to rid itself of this pest the State of Colorado paid out nearly $200,000 in bounties between March 14, 1881, and February 18, 1885. On the latter date the law was repealed. The distress caused by poison ivy is being constantly experienced by thousands of individuals.

Setting aside the criminal uses of poisonous plants, there are some other legal problems connected with them which are of general public interest. The common law of England holds a person responsible for damage accruing from the possession and cultivation of poisonous plants. In one case, for example, a jury rendered judgment in favor of a plaintiff whose horse was poisoned from eating branches of a yew which hung over a fence from an adjoining yard. A similar judgment for $3,500 has recently been rendered by a New York court against the directors of a cemetery in a case of poisoning due to poison ivy which had been allowed to grow within the grounds.

All poisonous plants are not equally injurious to all persons, nor to all forms of life. The most familiar illustration of this is to be found in the action of poison ivy. It has no apparent external effect upon animals, and a few of them, such as the horse, mule, and goat, eat its leaves with impunity. It acts upon the skin of the majority of persons but with varying intensity. Many people are probably wholly immune, but some lose their resistant power in middle life; others have been known to attain immunity from it to a very considerable degree. There is a similar variability in the effects of poisonous plants taken internally. The qualifications involved in a definition of a poisonous plant are numerous, and can not well be introduced into this report. It may suffice here to say that death in some cases is attributable not to any poison which the plant contains, but to immoderate or incautious eating, or to mechanical injury, such as is produced in horses by the hairs of crimson clover, which under certain conditions accumulate in large balls and obstruct the intestines, or to the effect of parasitic growths, such as ergot occurring on rye. Neither the clover nor the rye is poisonous.

Excluding all which operate in these ways, there is, however, a large number of really poisonous plants whose properties are comparatively unknown. Information relating to them is obtainable only from the most diverse sources. Cases of poisoning are described in medical journals, communicated by farmers, or simply alluded to in newspapers, and are traceable only through correspondence or personal inspection. Records of chemical analyses and toxicological experiments are scattered through all kinds of literature. Additional reason for the prevalent ignorance in regard to these plants is to be found sometimes in their limited geographical range, and sometimes in the uncertainty and often opposite results obtained by unscientific experiments.

In this bulletin it has been found impossible to give an adequate treatment of all of our poisonous plants. Those cultivated in gardens, such as the oleander (*Nerium oleander*), mezereon (*Daphne mezereum*), foxglove (*Digitalis purpurea*), and the species of Narcissus, have been omitted, as have those wild plants whose poisonous qualities have not been investigated at some length. In the latter category are the cockleburs (*Xanthium spinosum*, *X. strumarium*, and *X. canadense*), sleepy grass (*Stipa viridula robusta*), elder (*Sambucus canadensis*), pimpernel (*Anagallis arvensis*), and Labrador tea (*Ledum groenlandicum*). The limit of space has precluded a more extended treatment of many species, and cut out altogether many of the fleshy and all of the parasitic fungi.

The matter presented in this bulletin has been obtained in part from published articles or treatises, but most of it has not heretofore been printed. Besides the direct information secured through correspondence with medical men, scientists, farmers, and others interested in cases of poisoning, considerable information has been obtained from personal observation and experiment. The writer has had constant recourse to the valuable treatises of Cornevin, Blyth, Kobert, Dammann, Millspaugh, White, and Van Hasselt; to the numerous articles found in the various botanical and chemical journals; and to the medical literature indexed in the invaluable catalogue and Index Medicus of the Surgeon-General's library at Washington. Some assistance has also been obtained from the recent special publications of Dr. H. H. Rusby and Prof. Byron D. Halsted. The figures, with the exception of Nos. 2, 18, and 21, were drawn by Mr. F. A. Walpole, the artist of the Division of Botany.

GILL FUNGI (AGARICACEAE).

DEADLY AMANITAS.

Amanita.

The amanitas belong to the class of plants known as gill fungi (Agaricaceae), and include most of the plants popularly called toadstools and mushrooms. Many of these are delicious articles of food, and they are rapidly becoming more and more used for this purpose in the United States. In appearance none are more attractive than the deadly amanitas, especially the two which are treated of in this bulletin. A few of the 25 or 30 species of this genus are edible, but as fully one-third are known to contain deadly poisons, and as this is not so generally true of any other group, it is important that its characteristics should be pointed out.

The amanitas form the most typical genus of that group of fleshy fungi which is characterized by vertical radiating plates or gills on the under surface of the cap. In the early stages of growth the amanitas are egg-shaped and are entirely enveloped by a white flocculent covering, which is ruptured as the stem lengthens. In a few species this covering adheres in loose, corky patches to the top of the cap, as seen in fig. 1, but sometimes it slips away from the cap entirely and forms a more or less continuous sheathing cup at the base of the stem at the point of enlargement, as shown in fig. 2. This flocculent covering and the invariably bulbous base of the stem are the most important characteristics of the genus, while the different position of the flocculent covering after rupture helps to distinguish the species. These features are well pronounced as a rule, but sometimes it requires some searching to find the cup.

Besides the general envelope there is also a secondary one which at first covers the gills, extending from the stem outward in all directions horizontally to the rim of the cap. This breaks away from the cap before maturity and forms a more or less perfect and conspicuous collar about the upper part of the stem. Except in the case of one species noted below, the gills and spores are white. The geographical distribution of these fungi is not well known, as comparatively few individuals have studied them carefully.

FLY AMANITA.

Amanita muscaria (L.) Fr.

Other names: Fly fungus; fly agaric; fly killer; deadly amanita; false orange amanita. (Fig. 1.)

Description and habitat.—A handsome robust species, 4 to 16 inches high. It is singularly free from larval pests and the usual signs of decay, and is highly attractive in appearance, taste, and smell. In its early stages the shape of the cap is very strongly convex, but by gradual expansion it becomes flat and even concave. It is invariably warty. In color it varies from nearly white through all shades of yellow to a bright red. As a rule it is more reddish in the center and light yellow outward, but sometimes the color is uniform throughout. The enlarged base is marked with short, stubby projections of the epidermis, which are generally replaced upward along the lower part of the stem by soft flexible shavings, as seen in the figure. The general shape of the plant is very much like that of the orange Amanita (*Amanita caesarea*), but it differs conspicuously in the absence of a cup and in the possession of white instead of yellow gills and stems. It differs also in usu-

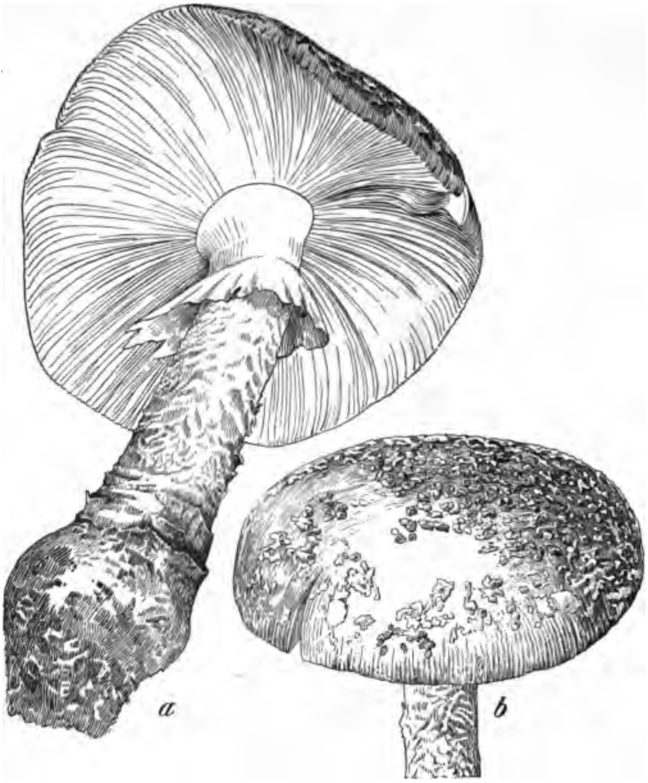

FIG. 1.—Fly amanita (*Amanita muscaria*): *a*, mature plant; *b*, top view of cap showing corky patches—both one-half natural size

ally having a warty instead of a smooth cap. Both grow in pine and oak forests from spring to autumn, but the edible species does not appear so late in the autumn as the other. From the common mushroom (*Agaricus campestris*) the fly amanita is easily distinguished by having white instead of purple gills and spores, by its warty cap and bulbous stem, and by its place of growth—the meadow mushroom never appearing in forests. The fly amanita is abundant in several localities in the United States.

It is the best known of all the poisonous species of fungi. As a fly poison it has been used in Europe for hundreds of years, and the origin of its use in northeastern Asia as an intoxicant is probably not much more modern. Poisoning is, however, not so frequently caused by it as by the closely related and more poisonous death cup (*Amanita phalloides*), yet many cases have been recorded, the most notable recent instance being that which occurred at Washington, D. C., on November 10, 1897, when Count de Vecchj died, having eaten the fungus for breakfast the preceding morning. Cattle are poisoned as well as men, and it is supposed that their flesh is thus rendered unwholesome.

Poisonous elements.—Several poisonous compounds are present in this fungus, the best known of which is the alkaloid muscarine. This is probably present in all parts of the fungus, but appears to be especially abundant in the spore-bearing surface or gills. When fed to animals this alkaloid produces an effect which is nearly but not quite that produced by the plant itself.

Symptoms of poisoning.—As deduced from experiments on animals, from authentic records of the effect on men who use small amounts of the fungus as an intoxicant, and from reliable descriptions of several cases of accidental poisoning, the symptoms come on generally within a couple of hours after the fungus is eaten. In some cases, however, which are alleged to have been caused by this species, the effects have begun to show themselves only after several hours. Characteristic symptoms in cases of poisoning are the retardation of the heart's action and an extreme difficulty in breathing. After from two to three hours there is a profound stupor, often preceded or accompanied by cold sweats and nervous phenomena—such as giddiness, double vision, and lockjaw. Vomiting sometimes gives relief to the patient, but it is often difficult to produce this effect after narcosis has set in, even with the most powerful emetics—such as apomorphine. Pain at the stomach is not a characteristic sympton of this poison. The stupor may last from eight to ten hours, in milder cases, and one or two days, in more serious cases. Death follows in from eighteen hours to two or three days, from a gradual weakening and a final stoppage of the heart's action.

Treatment.—The treatment for the fly amanita poison consists primarily in removing the undigested fungus from the alimentary canal, and in counteracting the effects of the muscarine upon the heart. The action of this organ should be fortified at once by hypodermic injections, by a physician, of some heart stimulant, preferably atropine, in doses of from 1/100 to 1/50 of a grain. As a stimulant emetic, mustard is particularly valuable. If this is not effective, apomorphine should be administered hypodermically by a physician. Tannin is of little or no value in rendering the muscarine insoluble in the stomach. If vomiting has not taken place, recently burned charcoal may be administered for its mechanical effect in absorbing the poison, or a couple of grains of permanganate of potash in a 1 per cent alkaline solution to decompose it. The use of this substance should be followed by oils or oleaginous purgatives, and the lower intestines should be washed out with an enema of warm water and turpentine. The use of atropine must be governed by the symptoms, but it is advisable to push it heroically, for in this alkaloid we have an almost complete physiological antidote to the poisonous principles of the fly amanita. Experiments on animals poisoned by this fungus and also by muscarine extracted from it have very clearly demonstrated that when the heart has nearly ceased to beat it may be stimulated almost instantly by a hypodermic injection of atropine. Its use, as thus demonstrated, has been the means of saving numerous lives. Muscarine may be dissolved out of the fly amanita to a great extent by vinegar, but the possible existence in the plant of such compounds as phallin (described under death cup) makes its use extremely dangerous.

The greatest diligence should be observed by market inspectors in preventing specimens of this and the following species from being accidentally mixed with edible species of fungi which are sold in the open markets.

DEATH CUP.

Amanita phalloides (L.) Fr.

Other names: Poison amanita; bulbous amanita. (Fig. 2.)

Description and habitat.—This is not so large or brightly colored as the preceding fungus, but is nevertheless decidedly attractive to the experimenting and untutored epicure. When fresh, it has neither a disagreeable odor nor taste, nor has it any ill appearance due to the presence of larvæ. It grows from 3 to 6 or 8 inches high and has a smooth, satiny cap, which is strongly convex at first, finally becoming flat or slightly concave. It is usually white or straw-colored, but may be green, light brown, yellow, or even spotted when found growing in dense shade. The stem is white and nearly smooth. The flocculent covering almost invariably slips away from the cap in this species and forms a more or less conspicuous cup at the base of the stem at the point of enlargement, as shown in figure 2. In dry weather it sometimes partially adheres to the cap. The cup is, however, invariably present. In connection with the white gills and spores and the bulbous base it is the distinguishing feature of the species. In general shape the death cup is somewhat like the common mushroom, but it is very much more like another species, the smooth lepiota (*Lepiota naucina*) which is considerably sought after by expert epicures. From the common mushroom the death cup may be at once distinguished by its cup, by its white gills and spores, and by its growing in woods instead of in meadows. Like the death cup, the lepiota has a smooth, satiny cap, white gills, and white spores, but it is distinguished by the absence of a sheathing cup and by the ball-and-socket attachment of the stem to the cap, as well as by its occurrence chiefly in meadows. The death cup is the most poisonous of all the fleshy fungi. It is found usually in pine forests, where it often grows in greater abundance than any other species of fungus. Sometimes, however, it encroaches upon lawns near the borders of woods. The plant is listed as growing in California and in various parts of the Eastern and Middle States. In the vicinity of Washington, D. C., it is exceedingly abundant in late autumn.

Poisonous element.—The poisonous constituent is phallin, a remarkable compound which resembles the white of egg in many of its peculiarities. It is therefore known as a "toxalbumin." Like the albumen of egg it is easily coagulated at a temperature somewhat below that of boiling water. Boiling decomposes this compound and renders it inert. Salt water dissolves it very readily. A large number of cases of poisoning have been attributed to this fungus in ancient as well as in modern times. In most of them the plant was taken to be an edible fungus. In a few instances the mere handling of the plant caused serious trouble. A third part of an uncooked medium-sized cap proved fatal to a boy 12 years of age. The effects of phallin were very accurately studied in 1891 by Professor Kobert at Jurjew (formerly called Dorpat), Russia. This investigator showed that the fundamental injury is not the paralysis of the nerves controlling the heart, as in the case of muscarine, but has its seat in the blood corpuscles themselves. These are rapidly dissolved, and the blood thus loses its vitality; the blood serum escapes into the alimentary canal, and the whole system is forced slowly but surely to give way. The symptoms are characteristic; no bad taste warns the victim, and it is usually not from until nine to fourteen hours after eating that the first effects appear. (Earlier symptoms in cases of amanita poisoning indicate the presence of muscarine or some other poison.) There is then considerable pain, and there may be cramps

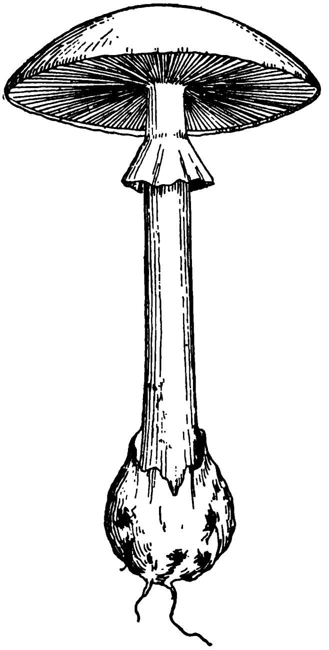

FIG. 2.—Death cup (*Amanita phalloides*), one-half natural size.

in the legs and other nervous phenomena, such as convulsions and even lockjaw. In a few cases there are tetanic spasms. The pulse is weak and either quick or slow in its action. The pupils of the eyes are sometimes dilated. The abdominal pain is rapidly followed by nausea, vomiting, and extreme diarrhea, the alvine discharges assuming the peculiar "rice water" condition characteristic of cholera. The latter symptoms are persistently maintained, generally without loss of consciousness, until death ensues, as it does in from two to four days.

Remedies.—Salt water is commonly used in the preparation of fungi for food and some pretense at cooking is generally observed. Such a treatment if thorough would remove the poisonous quality of the death cup, but the uncertainty of an adequate treatment is so great that the plant should be wholly rejected as a food. The danger is greater from the fact that there is no known antidote to phallin. In cases of poisoning by the death cup the undigested material, if not already vomited, must be removed from the stomach, and also from the alimentary canal. The same drugs recommended for fly fungus poisoning should be used where the symptoms seem to indicate the presence of muscarine or muscarine-like substances. As a last resort against the effects of the phallin, the blood should be transfused with a solution of common salt or with blood taken fresh from the veins of some warm-blooded animal. This can, of course, be attempted only by a well-skilled physician.

The vernal amanita or destroying angel, *Amanita verna* Bulliard, is regarded by some experts as identical with the death cup. It has the same poisonous action.

BUNCH-FLOWER FAMILY (MELANTHACEAE).

AMERICAN FALSE HELLEBORE.

Veratrum viride Ait.

Other names: American white hellebore; white hellebore; false hellebore; swamp hellebore; Indian poke; meadow poke; poke root (in N. H.); Indian uncus; puppet root; earth gall; crow poison; devil's bite; duckretter; itch weed; bugbane; wolfsbane; bear corn. (Fig. 3.)

Description and habitat.—A stout, herbaceous, simple-stemmed perennial, 2 to 7 feet high, with a fleshy root 1 to 3 inches long, large plaited stemless leaves of varying size, and a large, loose terminal cluster of yellowish-green flowers which blossom from May to July. The plant is native to the United States, where it grows abundantly in wet meadows and along mountain brooks throughout New England; southward in cold localities through New York and Delaware to Virginia, and in the Alleghany Mountains to Georgia; westward in northern Wisconsin, the mountains of Oregon, Washington, and Idaho, and in Alaska.

Poisonous constituents.—Chemical analysis shows that five or six alkaloids exist in the rhizome, the most important of which are jervine and cevadine. Veratrine is also found, but in very small quantity. The other parts of the plant have not been studied critically, but from analogy to the white hellebore (*Veratrum album*) of Europe, it is probable that all of the parts of our native species, including the flowers and seed, contain one or more of these alkaloids, and are therefore poisonous, but in a much less degree than is the root.

Causes of poisoning.—Cases arise mainly from overdoses in medicine, but instances of accidental poisoning are reported for man and for various animals and birds. In one case all of the members of a household were poisoned by eating the young leaves, which were mistaken for those of marsh marigold (*Caltha palustris*) and prepared for food. Animals do not relish the plant, which is acrid and burning in the fresh condition, but young animals sometimes eat it with fatal results. The root is not often mistaken for that of edible plants, but being fleshy and especially rich in alkaloids, it is somewhat dangerous. The seeds have been eaten by chickens with fatal results. The general effect of the plant is very much like that of aconite (*Aconitum napellus*), being directed chiefly against the action of the heart and spinal cord, both of which it tends to paralyze. It has also a violent, although somewhat tardy, emetic and cathartic effect, a property which is often effective in expelling the poison from the system before it accomplishes its deadly work.

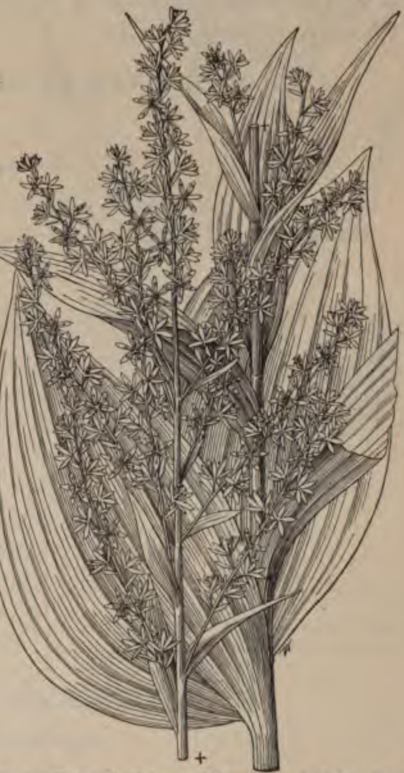

FIG. 3.—False hellebore (*Veratrum viride*), one-third natural size.

Symptoms.—Symptomatically its main physiological effect is as follows, viz: Burning in the throat and esophagus, increased salivation, defective vision, retching, vomiting, diarrhea, severe headache, vertigo, faintness, weak pulse, labored respiration, and profound prostration. Death is caused by paralysis of the heart.

Remedies.—In cases of poisoning empty the stomach as rapidly as possible, then give stimulants, such as brandy and strong coffee. A physician should give ether and opium hypodermically. The feet and hands must be kept warm and the patient should lie flat on the back to prevent attacks of vertigo.

Other native species.—Four other species of Veratrum are native to the United States, all of which are probably poisonous in the same way as the Eastern species just treated of. All but one of these are, however, more or less local in their distribution and need not be considered here. *Veratrum californicum* Durand is quite worthy of note. In general appearance it resembles the Eastern species. The flower cluster is less slender and more upright in habit, its flowers are white instead of yellowish green, and the floral leaves are longer and narrower. The plant is of frequent occurrence in the mountains of California and northward to British Columbia; also in Nevada and in the Rocky Mountains from Wyoming to New Mexico.

LILY OF THE VALLEY FAMILY (CONVALLARIACEAE).

LILY OF THE VALLEY.

Convallaria majalis L.

Other names: May lily; May blossom. (Fig. 4.)

Description and habitat.—A low, smooth, stemless perennial, with two broad, conspicuous leaves and a central scape bearing a number of pretty, sweet-scented white flowers. This plant, so well known in ornamental cultivation, is native to both Europe and the United States, but is found in this country in a wild state only in the higher Alleghany Mountains of Virginia, North Carolina, and Tennessee. In the latter State it grows luxuriantly on the humid western slopes of the Little and Big Frog mountains, at an altitude of 3,000 feet.

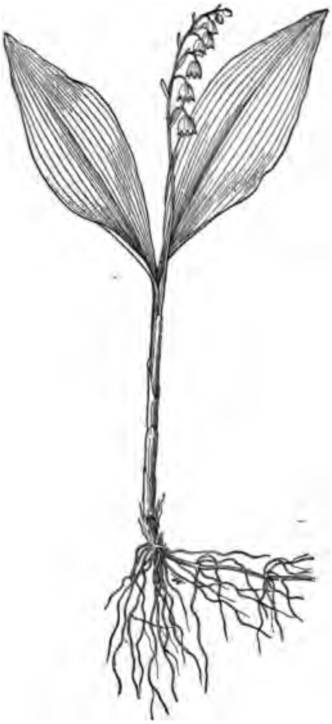

FIG. 4.—Lily of the valley (*Convallaria majalis*), one-third natural size.

Poisonous element.—The active constituent is convallamarin, an extremely poisonous crystalline compound with a bitter and afterwards sweetish taste, and a depressing action on the heart like that of the common foxglove (*Digitalis purpurea*). It is found in all parts of the plant, including the flowers. Few cases of poisoning are attributed to it, but the plant is dangerous on account of the beauty of its flowers. The taste of these, however, is acrid and bitter, and on this account there is much less danger of children eating them. Sheep and goats, it is said, may eat the leaves with impunity, but other animals refuse them.

Symptoms and remedies.—The emetic and purgative actions of the lily of the valley are quite marked. Besides these the prominent symptoms to be looked for in cases of poisoning are, at first, diminished, then infrequent and irregular heart action, and finally death from paralysis of the heart. No special antidote is known. The general treatment should be like that which would be adopted for digitalis poisoning, but varied according to the minor symptoms produced.

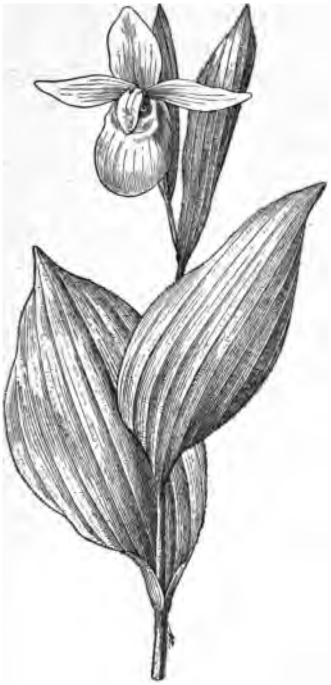

FIG. 5.—Showy lady's slipper (*Cypripedium reginae*), one-third natural size.

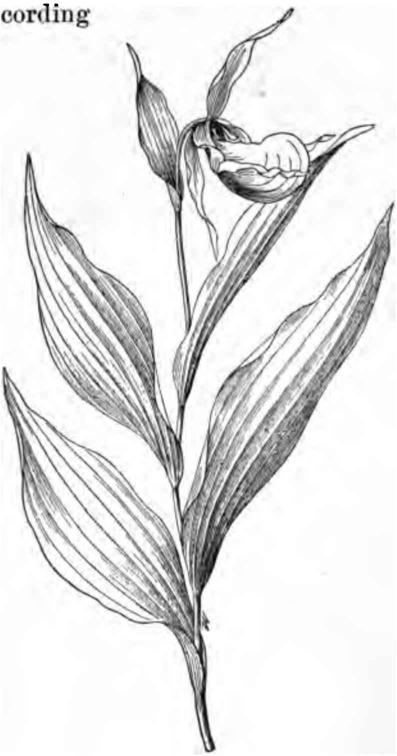

FIG. 6.—Larger yellow lady's slipper (*Cypripedium hirsutum*), one-third natural size.

ORCHID FAMILY (ORCHIDACEAE).

LADY'S SLIPPERS.

Cypripedium.

Other names: Moccasin flower; ducks (Pa.); whip-poor-will shoes (N. Y.).

Perennial plants with large, conspicuously parallel-veined and plaited leaves, and one or a few large, irregular pink and white or yellow flowers. The following species may be readily recognized:

SHOWY LADY'S SLIPPER.

Cypripedium reginae Walt.

Other names: Whip-poor-will shoes (Conn.); nerve root (New Brunswick); female nervine. (Fig. 5.)

Description and habitat.—A robust, somewhat hairy plant, 1 to 2 feet high, with white flowers usually striped with purple, blossoming from June to September. It grows in peat bogs and swamps from Maine to Minnesota, southward to Georgia and Missouri.

LARGER YELLOW LADY'S SLIPPER.

Cypripedium hirsutum Mill.

Other names: Lady's slipper; yellow lady's slipper; yellow moccasin; moccasin flower; nervine; American valerian; yellows; Noah's ark; yellow umbil; nerve root; Indian shoe; slipper root; Venus's cup; Venus's shoe; umble; male nervine; monkey flower. (Fig. 6.)

Description and habitat.—A hairy or pubescent plant, 12 to 18 inches high, with large, inodorous yellow flowers, appearing in May or June. It grows in bogs and low woods from Maine to Minnesota, southward to northern Alabama and Arkansas, and sparingly in Colorado.

SMALLER YELLOW LADY'S SLIPPER.

Cypripedium parviflorum Salisb.

Description and habitat.—A minutely hairy plant, 1 to 2 feet high, with yellow and brown flowers, blossoming in May and June. It differs from the preceding in the smaller size of its flower and in the possession of a sweet odor. It is found in bogs and low woods throughout nearly the same range as the preceding species, but extends farther northwestward, to the State of Washington.

Poisonous character.—The poisonous character of these plants was not suspected prior to 1875, when Prof. H. H. Babcock, of Chicago, who had annually been suffering, supposedly from recurrent attacks of ivy (Rhus) poisoning, discovered that the affection was most probably caused not by the ivy, but by the two species of lady's slipper first named above. Other instances were afterwards reported, but the facts were not positively ascertained until 1894, when an investigation was made by Prof. D. T. MacDougal, of the University of Minnesota. It was discovered that these plants are provided with glandular hairs which cover the surface of the stem and leaves and contain a poisonous oil. This oil is especially abundant at the fruiting season. Its action on the skin is very similar to that of toxicodendrol, the active constituent of poison ivy (*Rhus radicans*), but its exact chemical nature could not be ascertained on account of the small quantity obtainable. Experiments with the stem and leaves upon individuals showed that over half of them were affected by the first two species, and that the last was also poisonous, but in a minor degree. No accidental cases have been recorded against it. No specific antidote has been suggested.

PINK FAMILY (ALSINACEAE).

CORN COCKLE.

Agrostemma githago L.

Other names: Cockle; rose campion; bastard nigelle; old maid's pink (N. H.); mullein pink (Nova Scotia); licheta (Vt.); crown of the field. (Fig. 7.)

Description and habitat.—A whitish, woolly annual, 1 to 3 feet high, with an erect stem, showy, violet-red flowers, and numerous rough, black, irregularly-rounded seeds.

The corn cockle is a noxious weed in Europe, and in the United States it is now generally introduced in grain fields from Maine to North Dakota, southward through eastern Kansas to Louisiana and Florida; sparingly in Wyoming and California, and scarcely at all in the dry region extending eastward from California to Texas and eastern Kansas.

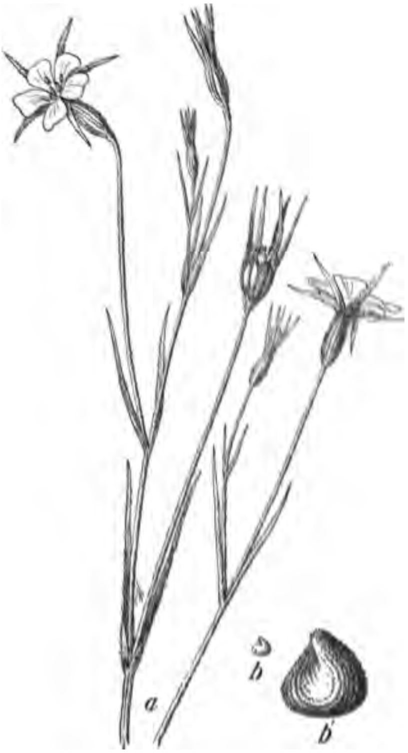

FIG. 7.—Corn cockle (*Agrostemma githago*): *a*, sprays showing flowers and seed capsule, one-third natural size; *b*, seed, natural size; *b'*, seed, four times natural size.

Poisonous constituent.—The poisonous constituent, saponin, is a noncrystalline powder, very freely soluble in water, and possessing a sharp, burning taste. It has no odor, but when inhaled in the smallest quantity it produces violent sneezing. When briskly shaken with water it froths like soap. The poison is found in nearly all parts of the plant, but mainly in the kernel of the seed.

Causes of poisoning.—Cases of poisoning have been noted among all sorts of poultry and household animals, but are rarely due to any portion of the plant as found growing in the field. The poisoning is generally produced by a poor grade of flour made from wheat containing cockle seeds. Machinery is used to remove these seeds from the wheat, but the difficulty of separating them is so great that the result is not entirely accomplished. The quantity remaining determines the grade of the flour in this particular regard. It sometimes amounts to 30 or 40 per cent, but this quality is sent out only by ignorant or unscrupulous dealers or is intended for consumption by animals only. Flour containing a smaller amount has often been made into bread and eaten, sometimes with fatal results, the baking not always being sufficient to decompose the poison. The effect may be acute, or, if a small quantity of the meal is eaten regularly, it may be chronic. In the latter case it is sometimes known as a disease under the name of "githagism."

Symptoms.—The general symptoms of acute poisoning are the following: Intense irritation of the whole digestive tract, vomiting, headache, nausea, vertigo, diarrhea, hot skin, sharp pains in the spine, difficult locomotion, and depressed breathing. Coma is sometimes present, and may be followed by death. Chronic poisoning has not been closely studied in man, but experiments upon animals show chronic diarrhea and gradual depression, the animal losing vigor in breathing and in muscular movements until death ensues. The action is antagonized by the use of digitalin, or of the simple extract of digitalis (*Digitalis purpurea*), a dangerous poison, which should be given only by a physican.

Corn cockle meal is easily detected in second and third class flour by the presence of the black, roughened scales of the seed coat. These are sure to occur if the flour has not been well bolted. Its presence is otherwise detected by the peculiar odor produced when the meal is moistened and by chemical tests with iodine.

Wheat containing corn cockle seeds should be rejected for planting.

CROWFOOT FAMILY (RANUNCULACEAE).

ACONITE.

Aconitum columbianum Nutt.

Other names: Monkshood; friar's cap; wolfsbane; iron hat; storm hat; blue weed. (Fig. 8.)

Description and habitat.—An erect, smooth, single-stemmed plant, 2 to 6 feet high, with a leafy base and an elongated terminal cluster of showy blue flowers. Aconite thrives best in moist open woods and by the side of brooks in Oregon and Washington, but extends along the mountains southward to Lake County, Cal., and to the southern Sierra Nevada (occurring sparingly in Arizona), and eastward, likewise in the mountains, to Montana, Wyoming, and Colorado, and even as far as South Dakota.

Other species.—Four other species are native to the eastern United States, and a fifth, the common monkshood of Europe (*A. napellus*) is a common garden plant. All are poisonous, but the western species is of most interest in the United States, being here the most abundant and most widely distributed.

Poisonous properties.—Few cases of accidental poisoning have been attributed to these plants, yet the European form has long been classed with the most violent poisons, only one-tenth of a grain of aconitine, its poisonous principle, being required to cause death. Most cases of poisoning arise from an ignorant or excessive use of the European aconite in medicine. Its root has, however, been mistaken for horseradish and the leaves for parsley. Horses and cattle have been seriously poisoned by eating small portions of the flowering tops.

All of the parts of the west American aconite are poisonous, but the seeds and roots are the most dangerous. The active principle is not well known, but chemical and physiological experiments point to the existence of one or more alkaloids which resemble aconitine. The effect of the poison is characteristic. There is first a tingling sensation on the end of the tongue which gives rise shortly to a burning sensation, and is rapidly followed by a very pronounced sense of constriction in the throat. The choking thus produced is made the more alarming by the retarding effect which the poison has upon the respiration. The tingling and prickling over the entire body is also characteristic. Besides these symptoms there are generally severe headache, abdominal pains, confused vision, vomiting, and diarrhea. Delirium is usually absent. Death ensues from a stoppage of the respiration in from one to eight hours.

Antidotes.—No specific antidote is recognized, but physicians have used atropine or digitalis and nitrite of amyl with good effects. The ordinary emetics and stimulants must be given. Artificial respiration should be maintained for a couple of hours, if necessary, and a recumbent position must be maintained throughout the treatment.

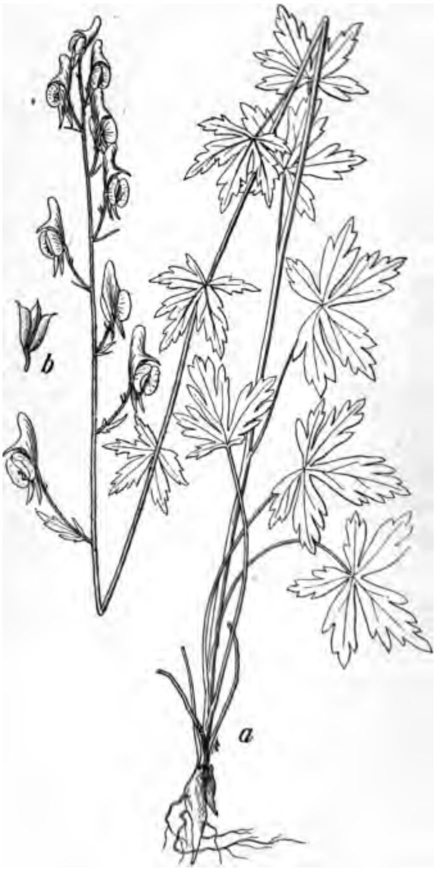

FIG. 8.—Aconite (*Aconitum columbianum*): *a*, flowering plant; *b*, seed capsule—both one-third natural size.

LARKSPURS.

Delphinium.

Description.—Erect herbs, with palmately lobed leaves, and an elongated cluster of showy flowers. These are commonly blue, and are further characterized by the absence of green parts, and the presence of a peculiar spur-like appendage.

Species.—There are over 25 species native to the United States. Few have a very wide distribution, but some of the Western species are extremely abundant in their native habitat. All share the general reputation for acridity borne by the plants of this order.

Poisonous properties.—The seed of the European stavesacre (*Delphinium staphisagria*) has long been regarded as a powerful poison. The seed of the commonly introduced larkspur (*D. consolida*) is regarded as less poisonous; the leaf is reputed to be poisonous to cattle in Europe. The leaf of the stavesacre has only recently been shown to be poisonous. The properties of the roots of these and other species are not well known. Little or no attention has yet been paid by American chemists to the native larkspurs, hence it is not known how poisonous they are in comparison with European. Their general reputation as plants poisonous to cattle is, however, very much more pronounced. The following have been reported to the Department of Agriculture:

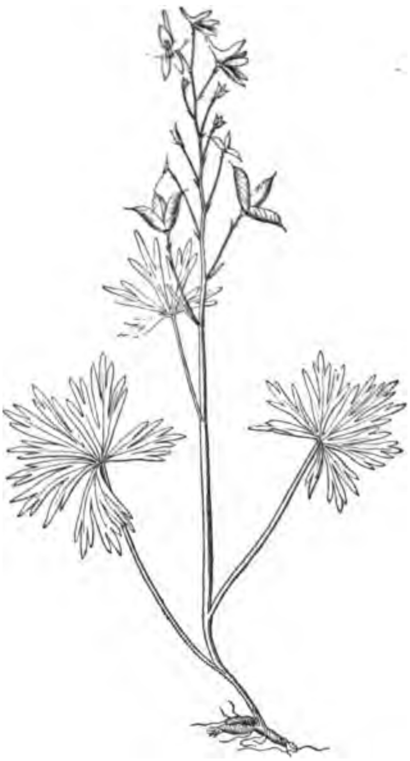

FIG. 9.—Dwarf larkspur (*Delphinium tricorne*), one-third natural size.

DWARF LARKSPUR.

Delphinium tricorne Michx.

Other name: Stagger-weed (Ohio). (Fig. 9.)

Description and habitat.—A smooth, simple-stemmed perennial, 6 to 12 inches high, with a tuberous root, deeply 5-parted leaves, and a long, loose cluster of blue (sometimes white) flowers, which appear in April and May. It grows in clayey soil and open woods, from Pennsylvania and the mountains of North Carolina to southern Minnesota. It is especially reported from Ohio as fatal to cattle in April, when the fresh leaves appear.

LARKSPUR.

Delphinium geyeri Greene.

Description and habitat.—A somewhat hairy perennial, 10 to 20 inches high, with a large spheroidal tuft of rather thick, dull-green leaves, and a central column of deep azure-blue flowers. A common high prairie plant of Wyoming and northern Colorado. It is reported to be the most troublesome of the poisonous plants of Wyoming. Ranchmen suffer considerable loss from it, especially in early spring, when the dark green tufts of foliage are conspicuous features of the otherwise dry and barren landscape.

PURPLE LARKSPUR.

Delphinium menziesii DC.

Description and habitat.—A somewhat hairy, tuberous-rooted perennial, about a foot high, with a basal cluster of finely divided, long-stemmed leaves, and a single column of showy blue flowers, which appear at any time between April and July. The flowers are few in number, but are extra large, being from 1 to 1½ inches broad. This species is found native on hillsides from the vicinity of San Francisco to British Columbia, eastward to Idaho, and even as far as South Dakota. In Montana it is very common throughout the State. In one case of poisoning, reported by the botanist of the Montana Agricultural College, over 500 sheep were affected, 250 of which were killed by the poison.

LARKSPUR.

Delphinium recurvatum Greene.

Description and habitat.—A smooth, or slightly hairy, fleshy-rooted perennial, 1 to 2 feet high, with a tuft of finely divided light-green leaves and a long cluster of lavender-colored flowers, which appear in March or April. The plant grows in moist, subsaline soil in California from San Francisco Bay southward along the coast, and in the San Joaquin Valley. It is particularly reported as fatal to animals in San Luis Obispo County.

LARKSPUR.

Delphinium trolliifolium Gray.

Other names: Cow poison (Humboldt County, Cal.).

Description and habitat.—A rather smooth, half woody-rooted perennial, 2 feet high or more, with large, long-stemmed basal leaves and a loose cluster of blue (partly white) flowers, which appear from March to June. The plant is common in shady places from Monterey, Cal., to British Columbia. Reports of poisoning come from northern California and Oregon.

Other species.—These do not include all of the poisonous species. A variety of *D. decorum*, native to the Sierra Nevada, has been suspected, and *D. scopulorum*, a Rocky Mountain species, has been reported to the Canadian department of agriculture as poisonous to cattle in the high western prairies of Canada.

Poisonous qualities.—The poisonous qualities of one of the above species (*D. trolliifolium*) has been considerably questioned, and experiments seem to show that neither the tops nor the roots of 24 plants will produce serious results when fed to cows. This does not, however, prove that a larger quantity would not be dangerous. A stockman very familiar with the plant claims that cows must feed on it for several hours before they will be affected seriously. This may also be the case with other species. Their comparative poisonous quality has not been studied. The percentage of fatal cases in cattle which have eaten larkspur is said to be small. A rough estimate by a cattleman places it at about 20 per cent for one species of the group, when the animals are not properly treated, and 5 per cent otherwise. This is probably a low estimate, however, for in a case of poisoning from *D. menziesii* that occurred in Montana in May, 1897, and was reported by Dr. E. V. Wilcox, nearly 600 sheep were affected, 250 of which died.

Remedies.—There is a general similarity in the poisonous action of the larkspurs, and this is strikingly like that of aconite or monkshood, which these plants also closely resemble botanically; further, it has been shown that the characteristic alkaloid of each has about the same behavior. The antidotes to be recommended are, therefore, the same as for aconite poisoning. Atropine was used last year with remarkable success by Dr. Wilcox. Melted lard (or bacon grease) is claimed to be an efficacious remedy in the hands of farmers. It is an excellent precaution to allow animals in pastures containing larkspur only when well fed, and then only for short periods, until they become thoroughly familiar with the deleterious nature of the plants.

PLUM FAMILY (PRUNACEAE).

BLACK CHERRY.

Prunus serotina Ehrh.

Other names: Wild black cherry; wild cherry; rum cherry; whisky cherry. (Fig. 10.)

Description and habitat.—A valuable forest tree, 60 to 80 feet high, with thin, reddish brown, scaly bark, tapering, saw-edged leaves, cylindrical clusters of small white flowers appearing in April and May, and shining black, edible fruit, about a quarter of an inch in diameter. It grows abundantly in forests in the Middle Atlantic and Ohio River States; less commonly in woods and in the open country in the southern New England and Gulf States, and westward from Illinois to South Dakota, eastern Nebraska, and Arkansas. As an ornamental and shade tree it is cultivated extensively in Wyoming and Colorado, and eastward to the Atlantic.

Fruit.—The fruit is rather agreeable, being but slightly bitter and astringent in taste. In some localities it is much used to flavor liquors.

Causes of poisoning.—Poisoning is frequently caused in cattle by eating the wilted leaves from branches thrown carelessly within their reach or ignorantly offered as food. Children occasionally die from eating the kernels of the seed or by swallowing the fruit whole. The poison is formed in the leaves of detached branches by the chemical action of two nonpoisonous substances which are present in the plant. Under certain conditions these compounds liberate prussic acid, one of the most deadly poisons. The fresh leaves are generally considered harmless. As they begin to wither, however, the acid is formed, but as this is volatile it disappears from the foliage in a short time. These facts thus serve to explain how it is that only the partially wilted leaves are considered poisonous.

Symptoms of poisoning.—The prominent symptoms of black cherry poisoning observed in cattle are labored respiration, diminished pulse, numbness, fright, protruding eyeballs, convulsions, and death from paralysis of the lungs. In some cases there is considerable frothing at the mouth; in all there is a very perceptible odor of prussic acid in the breath.

Remedies.—Death comes on rapidly, but nevertheless it is obligatory in case of a human subject to use emetics and advisable to wash out the stomach with a dilute solution of peroxide of hydrogen. A physician should administer a solution of cobalt nitrate, either internally or hypodermically. Artificial respiration and the use of oxygen gas should be resorted to. The extraction of blood and the transfusion of blood serum or salt solution should also be considered.

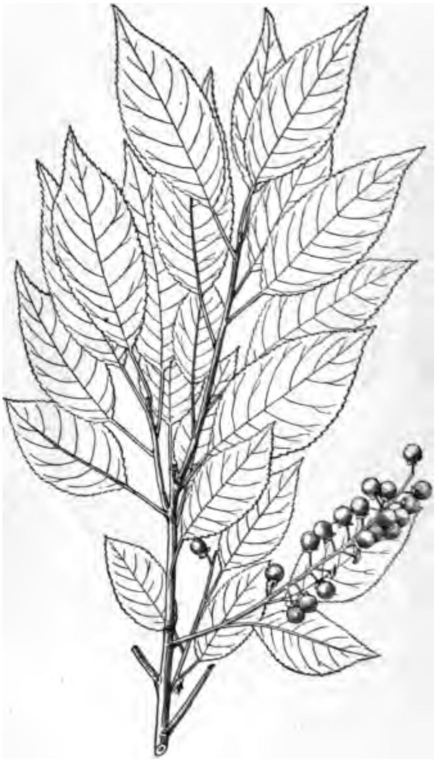

Fig. 10.—Black cherry (*Prunus serotina*), one-third natural size.

Other native species.—Other closely related species are likewise poisonous. The European cherry laurel (*Prunus laurocerasus*) has an established reputation. It is not common in this country, but is well known in central Mexico. The laurel cherry (*Prunus caroliniana*) of the southern coast States is also poisonous. It is largely cultivated in that region for ornament and as a hedge. The choke cherry (*Prunus virginiana*), a well-known shrub or tree distributed from the Rocky Mountains to the Atlantic, has not so tempting a fruit and is not extensively planted for ornament. It is therefore not so dangerous. The seeds of all varieties of cherries and plums, both native and introduced, are subject to suspicion; the flesh of none of the species is in any way poisonous.

The freshly cut branches of the trees should in no case be thrown where cattle can get at them.

SENNA FAMILY (CAESALPINIACEAE).

KENTUCKY COFFEE TREE.

Gymnocladus dioica (L.) Koch.

Other names: Coffee tree; American coffee bean; Kentucky mahogany; nicker tree; bonduc; chicot. (Fig. 11.)

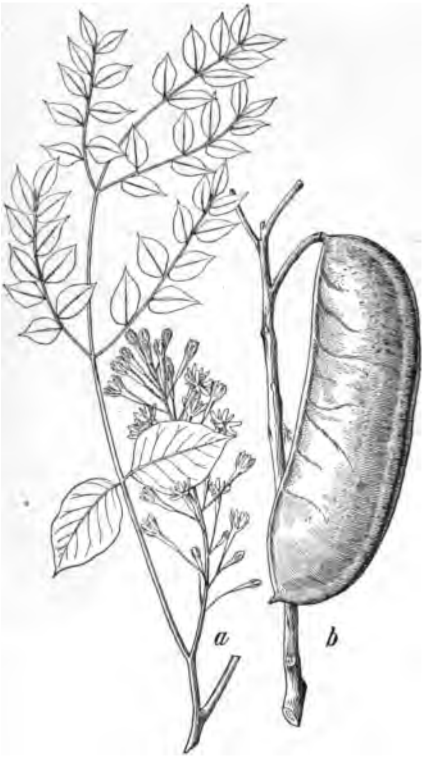

FIG. 11.—Kentucky coffee tree (*Gymnocladus dioica*): *a*, young branch with leaves and flowers; *b*, seed pod—both one-third natural size.

Description and habitat.—A robust, locust-like tree, 40 to 60 feet high, with rough, transversely broken bark, thornless branches, bipinnate leaves 2 to 3 feet long, with numerous leaflets; yellowish flowers, and large, conspicuous, woody seed pods. These are occupied by two or more large stony seeds and a mass of peculiar vaseline-like pulp. The tree grows more or less abundantly in rich soil along rivers from Nebraska to Arkansas, throughout Tennessee and the Ohio River region to western Pennsylvania.

Poisonous property.—The alkaloid cytisine, which exists in the closely related laburnum tree (*Cytisus laburnum*), is reported to have been found also in the leaves and in the fruit pulp of the coffee tree. Both of these parts have been used, when rubbed up with milk, to poison flies.

Symptoms and treatment.—Few accidental cases of poisoning arise, but the pulp, in one instance, caused severe illness in a woman who ate a small quantity, mistaking it for that of the honey locust (*Gleditsia triacanthos*), which is frequently eaten by children. The symptoms were not fully noted at the time, but are described from memory as conspicuously narcotic. The effect began within five minutes and lasted several hours. The treatment should probably be the same as that for laburnum, viz, emetics, stimulants, injections of coffee, and an alternately hot and cold douche to the head and chest.

PEA FAMILY (PAPILIONACEAE).

WOOLLY LOCO WEED.

Astragalus mollissimus Torr.

Other names: Loco weed; crazy weed. (Fig. 12.)

Description and habitat.—A silvery-white, silky-leaved perennial 8 to 12 inches high, with an abundance of soft foliage springing out in a cluster from a short central stem close to the ground. The flowers are pea-shaped and usually purple. The pod is distinctly two-celled. This plant is native to the Great Plains region, extending from western Texas and New Mexico northward to South Dakota and Wyoming, being most abundant in Colorado and in the western part of Nebraska and Kansas. It grows in the pasture lands of the dry prairie and on rocky hillsides.

How stock are affected.—Horses, cattle, and sheep are affected by loco, but the principal damage is done to horses. The effect is not acute, but in its slow progress simulates diseases caused by bacteria, worms, or other parasites or such as are caused in man by the continued use of alcohol, tobacco, or morphine. Two stages are recognized. The first, which may last several months, is a period of hallucination or mania accompanied by defective eyesight, during which the animal may perform all sorts of antics. After acquiring a taste for the plant it refuses every other kind of food, and the second stage is ushered in. This is a lingering period of emaciation, characterized by sunken eyeballs, lusterless hair, and feeble movements. The animal dies as if from starvation, in periods ranging from a few months to one or two years.

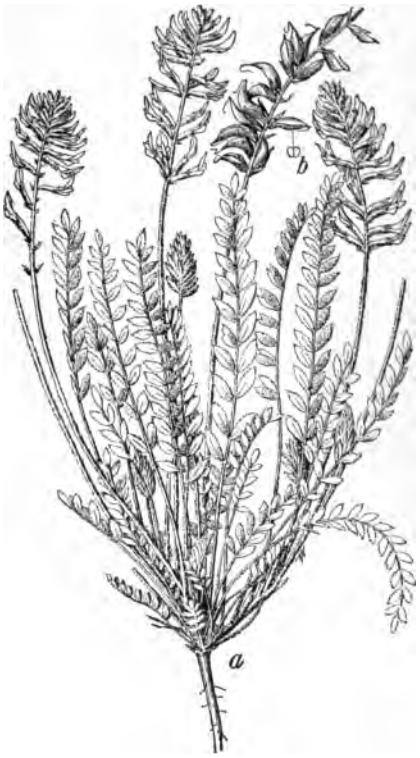

Fig. 12.—Wooly loco weed (*Astragalus mollissimus*): *a*, whole plant; *b*, section of pod—both one-third natural size.

Damage done.—The damage done to the live-stock business by this weed is immense. As mentioned in the introduction, the State of Colorado paid out nearly $200,000 in bounties between 1881 and 1885 to check its ravages.

Poisonous properties.—Chemists and medical men have studied the plants with much care, but until two years ago their efforts threw little light on the nature of the poison. In 1895, however, Dr. Carl Ruedi isolated an acid (loco acid) from it to which he attributed the poisonous qualities of the plant.

Antidotes.--No effectual antidotes have as yet been published, so the only remedy for the evil is to remove the animals from the vicinity of the plants as early as possible after they are affected, and then maintain them on some good nourishing food, in no case permitting them to return to the old pastures until the noxious plants have been removed.

The following recipe, suggested by Dr. Mayo in 1892, may be found serviceable in assisting the animal to recover vigor:

	Ounces.
Sulphate of iron, pulverized	1
Gentian root, pulverized	4
Ammonium chloride, pulverized	1
Potassium nitrate, pulverized	1

Mix thoroughly, and give from a heaping teaspoonful to a tablespoonful, according to the size of the animal, in the food three times daily.

This genus contains a large number of species and it is quite probable that many of these should be considered to be poisonous where they grow over wide areas of pasture land, and are green at periods when there is but little green grass. Over a half dozen have been reported to the Department of Agriculture as highly detrimental to the stock industry.

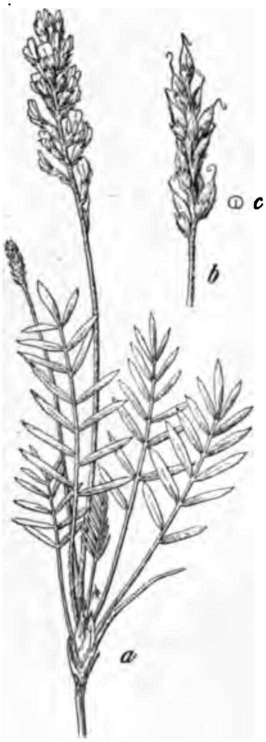

FIG. 13.—Stemless loco weed (*Aragallus lambertii*): *a*, flowering plant; *b*, seed pods; *c*, cross section of seed pod—all one-third natural size.

STEMLESS LOCO WEED.

Aragallus lambertii (Pursh) Greene.

Other names: Loco weed; crazy weed; Colorado loco vetch. (Fig. 13.)

Description and habitat.—This differs from the true loco weed most conspicuously in its more erect and branchless habit, its longer leaflets, which are linear or oblong instead of ovate, and the one-celled seed pod. It ranges over the same territory as does the woolly loco weed, but extends farther, being found throughout the Great Plains from British America to Mexico, and it also ascends higher in the mountains, at Silver Cliff, in Colorado, growing luxuriantly at an altitude of about 8,000 feet.

Symptoms.—So far as has been observed, the symptoms of poisoning are identical with those produced by the preceding species. The two plants are considered to be equally prejudicial to the stock-raising interests of New Mexico.

RATTLEBOX.

Crotalaria sagittalis L.

Other names: Rattleweed; wild pea. (Fig. 14.)

Description and habitat.—A hairy annual, 3 to 18 inches high, with simple undivided leaves, 1 to 2 inches long, and small yellow pea-like flowers appearing in July. The seed pods are about an inch in length when mature, and are nearly black. They are much inflated, and as the walls are stiff and thin and very resonant, they make excellent miniature rattles when the seeds have become detached. The rattlebox is native in low, sandy soils from the Atlantic westward to Minnesota and eastern Kansas; also in New Mexico. It is common in Connecticut, New Jersey, and North Carolina, and in some years is very abundant in bottom lands along the valley of the Missouri, in South Dakota and Iowa.

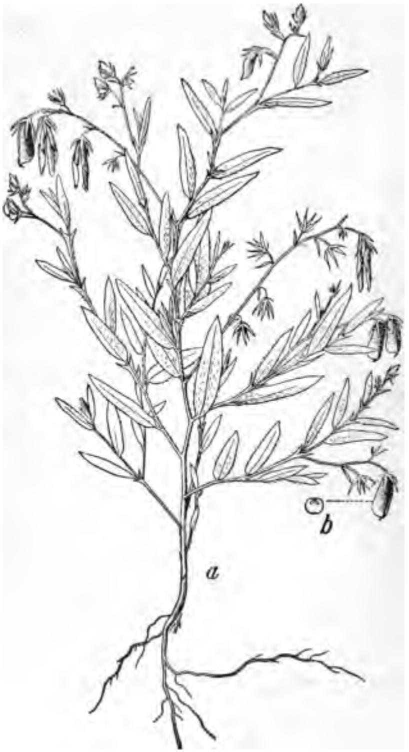

FIG. 14.—Rattlebox (*Crotalaria sagittalis*): *a*, whole plant; *b*, cross section of seed pod—both one-third natural size.

Poisonous element.—The poisonous constituent is unknown, but it resides both in the leaves and in the seeds. Horses and sometimes cattle are killed by eating grass or meadow hay mixed with the plant. They are not poisoned so often by eating the plant in the field. Public attention was first called to the poisonous nature of rattlebox by Dr. Stalker, of Iowa, who in 1884, while investigating the cause of "bottom disease," then prevalent among horses in Iowa, was led to believe that it was mostly if not altogether attributable to this plant. Extracts were prepared which, when fed to young horses, produced analogous symptoms and death. The pronounced symptoms for a moderate dose were great stupor and loud, heavy breathing. A larger dose caused death in one and one-half hours. Small doses repeated daily induced the characteristic stupor on the fifth day, and death on the thirteenth.

Symptoms.—As generally described from accidental cases, the symptoms are much more prolonged, death resulting only after several weeks or months. There is a general decline of vigor, and a gradual loss of flesh as observed in the case of loco, with which this plant is closely related. The rattlebox does not, however, appear so often to produce the craziness characteristic of loco.

Antidote.—No antidote has been suggested, but Dr. Stalker states that provided the animals are given a proper and nutritious diet, they will be greatly benefited by daily doses of 2 ounces of epsom salts, with 2 drachms of sulphate of iron and 1 drachm of nux vomica.

The percentage of rattlebox in meadow hay will be materially reduced if the fields are burned over when the seeds mature the preceding summer. The growth of perennial grasses will not be materially affected thereby.

SPURGE FAMILY (EUPHORBIACEAE).

SPURGES.

Euphorbia.

The spurge family, of which the Euphorbias constitute the typical genus, is represented in the United States by about 18 genera and over 200 species, many being widely and abundantly distributed in the colder as well as in the hotter sections of the country, though the species are more numerous in the latter. All contain a milky juice which is more or less acrid and irritating to the skin. Several exotic representatives of the order, such as the Brazilian physic nut (*Jatropha urens*), the European dog's mercury (*Mercurialis perennis*), and the East Indian *Croton tiglium*, the source of croton oil, are well known to be violent poisons. The deadly manchineel (*Hippomane mancinella*) occurs in Florida as well as in the West Indies, and the castor-oil plant (*Ricinus communis*) is largely cultivated and introduced in the Southern and Western States. Many species are known to produce disagreeable skin eruptions, either on account of their stinging hairs, as in the Southern spurge nettle (*Jatropha stimulosa*) and in *Tragia nepetaefolia*, or by their acrid juice. Some, such as *Croton setigerus* of California and *Euphorbia marginata* (fig. 16), furnish a deleterious honey, and some are used as fish and arrow poisons.

A large proportion of these plants belong to the spurge genus proper (Euphorbia). It is a genus characterized by its milky juice and its incomplete and mostly inconspicuous flowers. Several of the latter are grouped together on a small receptacle surrounded by an involucre, sometimes showy, the whole having the appearance of a single flower. One flower from each involucre finally develops a conspicuously three-celled and three-seeded fruit. The leaves assume brilliant colors in some species, which are therefore cultivated for ornament. The native species are mostly herbaceous. The spurges maintain the general reputation of the family as poisonous plants in all of the ways indicated above, and additionally by overdoses when used as a purgative, by poisoning cattle that eat of them or drink water into which the plants have been thrown, and indirectly, it is claimed, by poisoning the milk of animals that have fed upon the various species. Gardeners are sometimes poisoned while trimming the cultivated plants (Poinsettias). Spurge poisoning is due to two or three constituents which are, perhaps, common to all the species, but the subject has not been very closely investigated and the poisons are not well known. The symptoms produced by one of the common introduced species may be taken as typical.

CAPER SPURGE.

Euphorbia lathyris L.

Other names.—Garden spurge; myrtle spurge; mole plant; mole weed; mole tree; gopher plant; anti-gopher plant; wild caper; caper bush; wolf's milk; springwort. (Fig. 15.)

Description and habitat.—A smooth herbaceous perennial, 2 to 3 feet high, with a stiff, erect stem, and opposite, four-ranked leaves, the lower of which are thick and oblong, the upper thin, broad, and heart-shaped. The flowers are greenish-yellow and rather small. The three-seeded fruit is conspicuous. It is a common garden plant, sparingly introduced in wet ground in California and Texas, and in the Atlantic States from New Jersey to West Virginia and North Carolina.

Poisonous properties.—The fresh milky juice is exceedingly acrid and the fruit is highly purgative and poisonous. When used as a household remedy it often provokes serious trouble. Women and children are not infrequently poisoned by handling the plant and getting the juice on the face. Cattle are quite resistant to its influence, but they are sometimes overcome. Goats will eat the plant extensively if nothing better presents itself, and it is said that their milk then possesses all of the venomous properties of the plant. When applied to the skin the juice causes redness, itching, pimples, and sometimes gangrene; the effect often lasting more than a week. The seed taken internally in overdose will inflame the mouth and stomach, and cause intense diarrhea and vomiting. If the dose is sufficient there will be nervous disorders, unconsciousness, general collapse, and death.

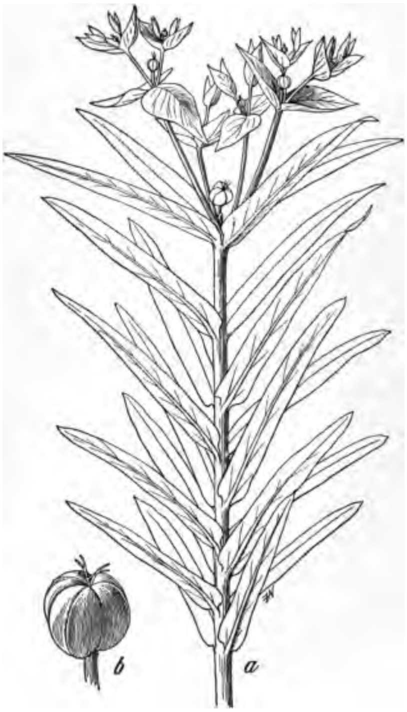

FIG. 15.—Caper spurge (*Euphorbia lathyris*): *a*, upper half of plant, one-third natural size; *b*, seed capsule, natural size.

Antidotes.—In cases of internal poisoning empty the stomach at once by means of the stomach pump or emetics, and give the patient milk, white of egg with water, or flaxseed tea, to drink. Bathe in warm water to which ammonia or mustard has been added, and inhale dilute ammonia. If superpurgation occurs, opium should be administered by a physician. In the case of two children, who were poisoned at Oakland, Cal., by eating a few seeds, ipecacuanha and *Veratrum viride* were administered with good effect. In cases of skin poisoning a wash of an alcoholic solution of sugar of lead (lead acetate) should be tried.

SNOW ON THE MOUNTAIN.

Euphorbia marginata Pursh.

Description and habitat.—An annual plant 2 to 4 feet high, differing most conspicuously from the preceding species in its more flexuous and less branching habit, and in having its upper leaves broadly margined with white. Its general aspect is far more pleasing to the eye, and on this account it is more frequently gathered for decorative purposes. This spurge is a native weed of the Great Plains from Montana to Mexico, and is spreading eastward rapidly to Louisiana and through southern Minnesota and Missouri to Wisconsin, Illinois, and Indiana. It is cultivated considerably for ornament, especially in the Northern Atlantic States, where it has frequently escaped from cultivation. It has recently been introduced as a weed into Germany.

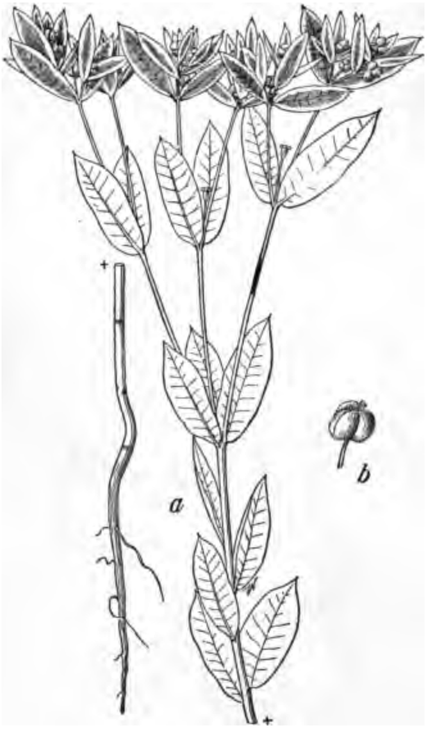

FIG. 16.—Snow on the mountain (*Euphorbia marginata*): *a*, whole plant, one-third natural size; *b*, seed capsule, natural size.

Poisonous property.—The poison of this plant reaches the stomach so far as known only through the eating of honey derived from its flowers. Large quantities of fall honey are annually made unsalable in localities where the plant grows in great abundance. The honey is hot and disagreeable to the taste, but does not appear to be a very serious poison, its effects being confined mostly to vomiting and purging. The milky juice when applied to the skin very often causes an itching inflammation, accompanied by pimples and blisters which last for several days. The general effect is much like that observed in rhus poisoning, for which it is sometimes mistaken. This blistering action is, in fact, so decided that a few stock raisers in Texas use the juice to brand cattle, it being held by them to be superior to a red-hot iron for that purpose because the scar heals more satisfactorily.

The large flowering spurge (*E. corollata*) and the ipecac spurge (*E. ipecacuanhae*) produce the same effect as the above species, but not so frequently and only to a minor degree. The effect of all is to be counteracted in the same way as the effect of the caper spurge. Children should be especially warned against handling them.

SUMAC FAMILY (ANACARDIACEAE).

POISON IVY, POISON OAK, AND POISON SUMAC.

Rhus.

Woody perennials, with alternate, mostly compound leaves and small greenish-white or yellowish flowers. All the well-known species with an upright terminal cluster of colored fruit are harmless.

POISON IVY.

Rhus radicans L.

Other names: Poison oak; poison vine; three-leafed ivy; poison creeper; mercury or markry (N. H. and N. J.); black mercury (Me.); markweed (Me.); pickry (Me.). (Fig. 17.)

Description and habitat.—A climbing or trailing shrub (sometimes erect), with variable three-foliate leaves, aerial rootlets, and greenish flowers, appearing in May and June. The smooth, waxy fruit often remains on the plant until late in winter. The leaves often resemble those of the box elder, as in the figure; but their margin is not seldom almost entire. They differ from those of the Virginia creeper in having only three leaflets instead of five. Poison ivy grows everywhere in open brush, in ravines, and on the borders of woods, and it is spread along roadsides and cultivated fields from seeds carried by crows, woodpeckers, and other birds that feed upon its fruit in winter. The plant occurs abundantly throughout the United States as far west as eastern Texas, eastern Kansas, and Minnesota, and in greater or less abundance throughout the less arid region of the West, with the exception of California, where it appears to be entirely replaced by *Rhus diversiloba.*

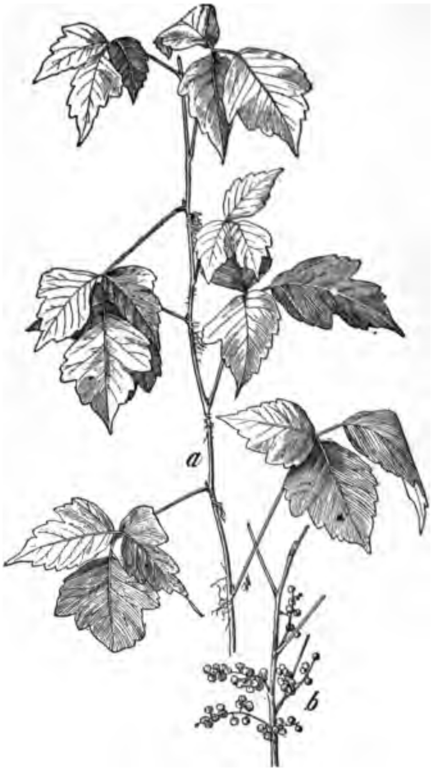

FIG. 17.—Poison ivy (*Rhus radicans*): *a*, spray showing aerial rootlets and leaves; *b*, fruit—both one-fourth natural size.

POISON OAK.

Rhus diversiloba Torr. & Gr.

Other names: Poison ivy; yeara; California poison sumac. (Fig. 18.)

Description and habitat.—The poison oak differs from the preceding species mainly in the character of its leaflets, which are somewhat thicker and smaller, more nearly elliptical, and less sharply lobed. Their similarity to the leaves of the Western oaks gives the plant its common name. The poison oak thrives best on cool westward mountain slopes and in ravines, but is quite generally spread throughout the Pacific coast from Lower California and Arizona to British America. It does not, however, frequent the higher mountains.

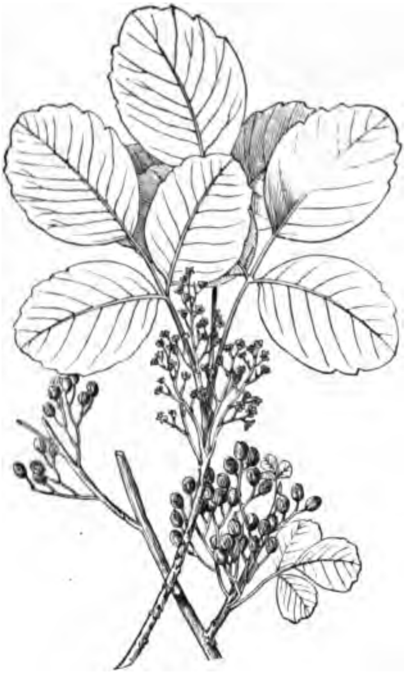

FIG. 18.—Poison oak (*Rhus diversiloba*), showing leaves, flowers, and fruit, one-third natural size.

POISON SUMAC.

Rhus vernix L.

Other names: Swamp sumac; dogwood (Mass.); poison dogwood; poison elder (Ala.); poison ash (Vt.); poison tree; poison wood; poison swamp sumac; thunderwood (Ga., Va.). (Fig. 19.)

Description and habitat.—An arborescent shrub 6 to 30 feet high, with long, pinnate leaves having from 7 to 13 entire leaflets. The wood has a faint sulphurous odor, which, together with the leaf scars, which are very prominent, enables one to distinguish the plant from other shrubbery in winter. It grows in swamps and in damp woods from Florida to Canada and westward to Louisiana.

Each of these species produces about the same effect on the human skin. It will therefore be sufficient to consider the most widely known representative of the group, viz, *Rhus radicans*, the poison ivy.

Poisonous character.—No plant of the United States is more popularly recognized as harmful to man than this. Its effects are familiar to everyone, and, as its victims far outnumber those of all other plants combined, it has come to be regarded as *the* poisonous plant of America. Until recently no one was able to tell how its effects were produced or to what principle they were due. At the beginning of the present century it was supposed to be a vapor or exhalation from the plant; then, with successive stages in the development of chemistry and biology, it was attributed to a specific gas, a volatile alkaloid, a volatile acid, and to bacteria. Experiments seemed to verify each of these ideas in turn, but that all were erroneous has recently been shown by the discovery that the poison is in reality a nonvolatile oil. In January, 1895, Dr. Franz Pfaff, of the Harvard University Medical School, announced this discovery. The oil has since been purified and named toxicodendrol. It is found in all parts of the plant, even in the wood after long drying. Like all oils, it is insoluble in water, and can not therefore be washed off the skin with water alone. It is readily removed by alcohol. Alkalies saponify it and thus render it inert, but the oil is very much more easily destroyed, as Pfaff has shown, by an alcoholic solution of the sugar of lead (lead acetate).

Effect of the poison.—Numerous experiments show conclusively that the oil produces precisely the same effect as does the plant itself. When a very minute amount is placed upon the skin it is gradually absorbed in the course of a day or so, and within certain limits the effect is proportional to the time of contact. In an experiment performed by the writer the oil was applied to four places on the left wrist, and these were carefully guarded to prevent spreading. At the end of an hour one of the spots was thoroughly washed by successive applications of alcohol; in three hours the oil from a second was washed off in the same manner, and the others were cleansed three hours later. There was little or no effect on the first; that on the second was more marked, but did not equal that produced on the last two, which was about the same in each. The spots were within an inch of each other, but remained wholly distinct, a fact which very clearly shows that the affection is not spread by the blood. Subsequent applications of an alcoholic solution of sugar of lead gave speedy and permanent relief.

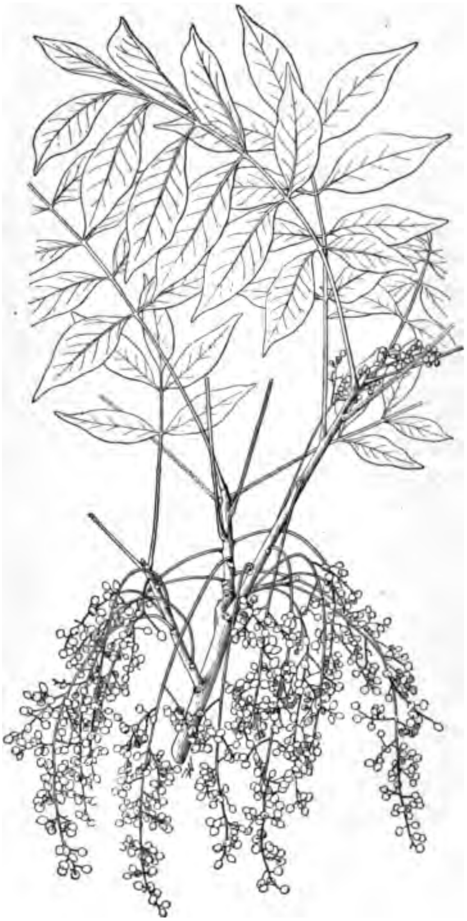

FIG. 19.—Poison sumac (*Rhus vernix*), showing leaves, fruit, and leaf-scars, one-fourth natural size.

Remedies.—In practice it is not desirable to use strong alcohol, which is apt to be too irritating to a sensitive surface, but a weaker grade of from 50 to 75 per cent should be preferred. To this the powdered sugar of lead is to be added until no more will easily dissolve. The milky fluid should then be well rubbed into the affected skin, and the operation repeated several times during the course of a few days. The itching is at once relieved and the further spread of the eruption is checked. The remedy has been tried in a large number of cases and has always proved successful. It must be remembered, however, that the lead solution is itself very poisonous if taken internally.

Much has been said in regard to the relative poisonous character of these three plants. It has been generally claimed that the poison sumac is the most poisonous, and that after it comes, first, the poison ivy and then the poison oak. These conclusions were arrived at from the occasional experience of individuals who were poisoned by handling one species when supposedly immune to others. Experience teaches, however, that immunity is somewhat variable in the same individual, and therefore these general statements can not be accepted without more careful experimental evidence.

Restrictive and preventive measures.—It is highly desirable that legal measures be adopted compelling the destruction of these plants where they abound in places of popular resort. This can be managed without much danger from the poison, and is a matter of very general public interest. As has just been noted, many individuals are practically immune from the effects of toxicodendrol. Advantage should be taken of this fact to employ such individuals to remove these plants from the vicinity of dwellings and from playgrounds. Much of the work would be purely mechanical, consisting in rooting the plants up by main force. This is the most certain method; the use of concentrated sulphuric acid is attended with less danger, as the plants do not need to be touched. A half teaspoonful should be applied to the stem every two or three weeks in the springtime when the plant is growing most vigorously. Care should be taken to keep the acid away from the skin, as it is most highly corrosive. The brush should in no case be left upon the ground nor used for fuel, and in burning it in the field pains should be taken not to inhale the smoke nor to handle the wood any more than necessary.

The greatest care should be exercised in preventing workmen from transferring the oil from their clothes and hands to other individuals. To accomplish this object special suits should be worn, and the hands should be washed several times a day with the alcoholic sugar of lead solution described above. Bathing in hot water with strong soapsuds is also strongly recommended. The clothing must also be well washed, and it is always well to remember that towels may be a means of conveying the oil.

BUCKEYE FAMILY (SAPINDACEAE).

RED BUCKEYE.

Aesculus pavia L.

Other names: Small buckeye; buckeye; horse-chestnut. (Fig. 20.)

Description and habitat.—A shrub 8 to 12 feet high with opposite, long-stemmed leaves, and numerous clusters of bright red flowers, which appear in March. The fruit is smooth even when young; the seeds are mahogany-colored and are elegantly polished. The red buckeye is native in fertile valleys from Virginia to Florida, throughout the Gulf States to Louisiana, and in Arkansas. It is sparingly represented in Missouri, Tennessee, Kentucky, and West Virginia. It is cultivated to some extent in Pennsylvania.

Poisonous character.—The poisonous constituent is nearly identical with that of the corn cockle, and it is found especially in the young shoots and in the seed. The records of its poisonous action are mostly confined to its use as a means of procuring fish, but cattle are often killed by eating the fruit. It was formerly, and perhaps is still, the practice to stir the bruised seeds or twigs into small ponds and gather the stupefied fish by hand as they rise to the surface. When thoroughly cooked these fish are quite wholesome.

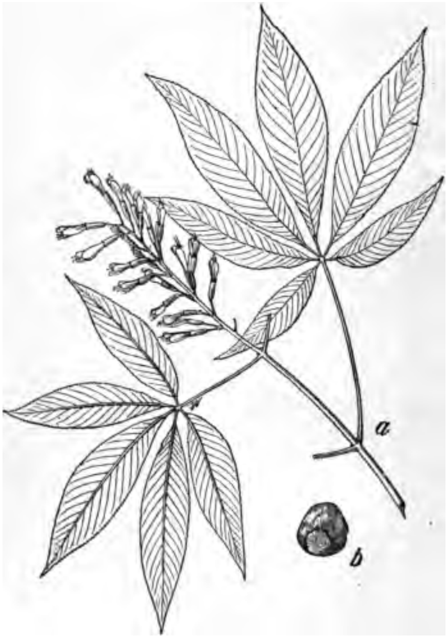

FIG. 20.—Red buckeye (*Aesculus pavia*): *a*, flowering branch; *b*, seed—both two-ninths natural size.

Uses.—Other species of buckeye are used in medicine and in domestic economy. They all have a similar action and probably contain the same poison. Of these species the best known is the true horse chestnut (*Aesculus hippocastanum*). Its bark and nuts are used as a snuff to promote nasal discharge and as a wash for indolent ulcers. The nut itself is used as a salve with lard, or as a wash, for rheumatism. The nut shell is narcotic. In England the fruit is fed to animals, but only after the removal of the poison by thorough washing with alkali and water and then boiling. Cases of poisoning have arisen from overdoses in medicine. The Ohio buckeye (*Aesculus glabra*) is regarded as intermediate between the above species in its poisonous qualities. Overdoses in medicine produce nearly the same symptoms as corr cockle. The fruit of the California buckeye (*Aesculus californica*) is sometimes made into soup and bread by the Round Valley Indians after removing the poison by roasting and leaching. The fruit of all the species furnishes an excellent grade of starch when properly treated. The roots and fruit of some have been sometimes used in place of soap.

CARROT FAMILY (APIACEAE).

WATER HEMLOCK.

Cicuta maculata L.

Other names: American water hemlock; wild hemlock; spotted hemlock; spotted parsley; snakeweed; beaver poison; musquash root; muskrat weed; cowbane; spotted cowbane; children's bane; death of man. (Fig. 21.)

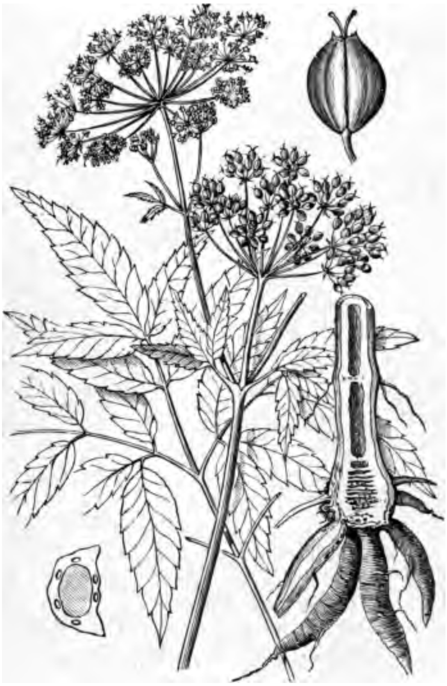

FIG. 21.—Water hemlock (*Cicuta maculata*), showing section of spindle-shaped roots and lower stem, the leaves, flowers, and fruit, one-half natural size; also fruit and cross section of seed, enlarged five times.

Description and habitat.—A smooth, erect, perennial, 3 to 8 feet high, with a rigid, hollow stem, numerous branches, finely dissected leaves, white flowers, and a cluster of spindle-shaped roots, which vary in length from 1½ to 3 inches, and are very characteristic of the plant. It grows commonly in swamps and damp soil, throughout the Atlantic States, westward to Louisiana, Iowa, and Minnesota; much less commonly northwestward through Nebraska, to the Rocky Mountains, and in New Mexico.

Poisonous property.—Its poisonous property resides in an aromatic, oily fluid, which is found chiefly in the root, but also in the stem, seeds, and leaves. Its true chemical nature is not exactly known, but it is highly probable that it contains the alkaloid conine, and the bitter principle cicutoxin, the latter of which is characteristic of the European water hemlock (*Cicuta virosa*). Both are powerful poisons, but the latter is the more violent and produces most of the symptoms characteristic of the plant. The American water hemlock is one of the most poisonous plants native to the United States. Its victims include both man and animals. The underground parts are the most poisonous, and are especially dangerous, because they are often washed or frozen out of the soil and thus exposed to view. Children mistake them for horse-radish, parsnips, artichokes, sweet cicely, and other edible roots. Cattle sometimes eat the tubers, and in marshes they are poisoned by drinking water contaminated by the juice of roots which have been crushed by being trampled upon. No estimate can be made of the amount of damage done to live stock, but it is very considerable. The human victims average a considerable number per annum. In the State of New Jersey alone, as earlier mentioned, two quadruple cases were reported during the spring of 1896, which resulted in the death of two individuals.

Symptoms and antidote.—The prominent symptoms are vomiting, colicky pains, staggering, unconsciousness, and frightful convulsions, ending in death. As no chemical antidote is known, the treatment must consist in a thorough cleansing of the digestive tract, and in combating the symptoms as they arise by the use of chloroform, chloral, and such medicines as are indicated during the progress of the malady. Herbivorous animals generally die from the effects of a sufficient dose, but they are sometimes saved by the administration of two or three daily doses of melted lard.

OREGON WATER HEMLOCK.

Cicuta vagans Greene.

Other names: Water hemlock; cicuta. (Fig. 22.)

Description and habitat.—A smooth perennial, with erect or straggling stems 3 to 6 feet high, glaucous, compound leaves which spring directly from the ground, white flowers blossoming in July and August, and a fleshy root which consists of two very distinct and characteristic parts. The more conspicuous of these is the vertical rootstock, which is from 1 to 6 inches long by 1 or 2 thick, and is curiously divided into numerous chambers by horizontal partitions. Each of the latter bears several tubes or ducts, from which a poisonous aromatic oil

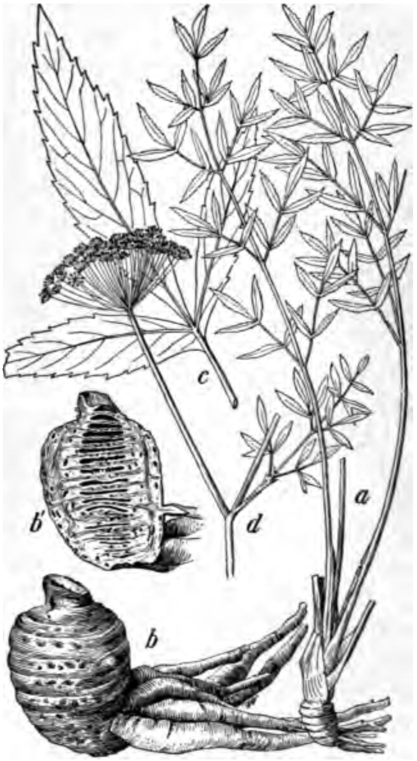

FIG. 22.—Oregon water hemlock (*Cicuta vagans*): *a*, plant with leaves, one-sixth natural size; *b* and *b'*, rootstock and horizontal roots, showing section, half size; *c*, terminal leaflets, one-sixth natural size; *d*, flowering spray, full size.

exudes when the bulb is cut. The tubes are larger and more numerous in the outer walls. The rootstock furnishes the bulk of the poison. The other portion of the root consists of solid, fleshy fibers, which run along on, or just under, the surface of the soil, and send off numerous rootlets from beneath. The rootstock rots or dwindles away almost entirely before the seeds mature, but fresh ones are formed from it for the next season's growth. The plant grows in wet or marshy places, and ranges from British Columbia and Idaho southward to northeastern California, and perhaps to the southern Sierra Nevada.

Cases of poisoning.—Cases of cattle poisoning have been reported from Victoria, British Columbia, Colby, Wash., from various parts of Oregon, and from northern California. Prof. U. P. Hedrick, of Corvallis, Oreg., who has investigated cases of poisoning from this plant, believes that more than one hundred cattle are killed by it every year in Oregon. A piece of the winter rootstock the size of a walnut was found to be fatal to a cow. A piece the size of a marble is looked upon as dangerous to man. Human cases are not numerous, but a few have been reported where individuals nibbled at the root through curiosity.

The Oregon water hemlock has often been mistaken for the preceding species and also for *Cicuta virosa* L., but neither of these occur in the far Northwestern States. Some other plants that are mistaken for it are the so-called "wild celery" (*Oenanthe sarmentosa*), Oregon sweet cicely (*Glycosma ambigua*), and poison hemlock (*Conium maculatum*). These are all easily distinguished by the root, which in no case resembles the one here figured.

Antidotes.—All that is stated under the water hemlock with regard to its poisonous constituents, symptoms, and antidotes may be applied also to this plant. It is likewise in need of chemical examination.

Other species.—To these two species there are to be added a few others which have been suspected in cases of poisoning and which have the same effects. As stated above, *Cicuta virosa*, the species which is particularly known to be poisonous in Europe, does not seem to occur in the United States. Specimens sent from Hon. J. R. Anderson, deputy minister of agriculture of British Columbia, do seem, however, to belong to this species. We are informed that several cases of poisoning have occurred there which were due to eating its fine fibrous roots, which were mistaken for those of a similar aromatic plant, *Ligusticum scoticum*, the long rootlets of which are much sought after by the French Canadians under the name "queue des rats." *Cicuta bulbifera* is found in the Great Lakes States, in West Virginia, New Jersey, and northwards. *C. bolanderi* is the largest of all the species, often attaining a height of 10 feet. It is found only locally near the bay of San Francisco. These species grow best in damp, marshy soil, and resemble the preceding in their general appearance. They are best distinguished botanically by the character of their underground parts.

When these plants occupy large areas the only safeguard for cattle is to keep them on other pastures, especially when they are hungry. The plants may be destroyed by hand pulling when they occur in small quantities near dwellings or playgrounds.

POISON HEMLOCK.

Conium maculatum L.

Other names: Hemlock; wild hemlock; spotted parsley; stinkweed; herb bennet; poison root; poison snakeweed; cashes; wode-whistle. (Fig. 23.)

Description and habitat.—A smooth, purple-spotted, hollow-stemmed biennial, 2 to 7 feet high, with large parsley-like leaves and showy clusters of small white flowers which appear in July and August. The seed is prominently ridged and has on its inner surface a deep, narrow, longitudinal groove. The fresh leaves have an extremely nauseating taste, and when bruised emit a very characteristic mouse-like odor. Poison hemlock is native to Europe and Asia, but has become naturalized in the United States, and is rather frequent or common on waysides and in waste places in New York, West Virginia, Pennsylvania, New Jersey, and Ohio, and not rare in the New England States and in Michigan. It is infrequent in Wisconsin, Illinois, Louisiana, and California, but in some localities in the latter State it has a very rank growth.

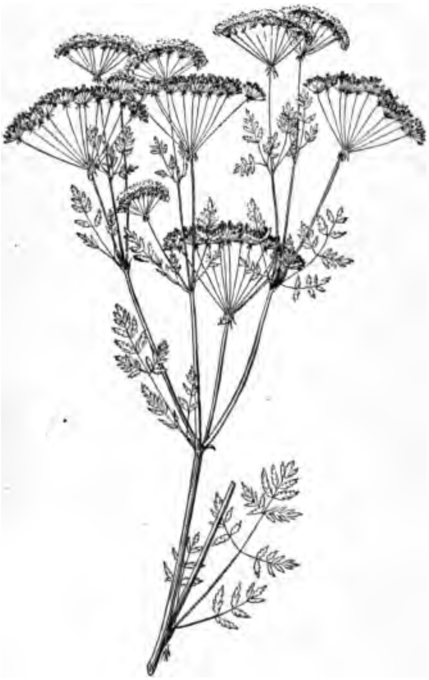

FIG. 23.—Poison hemlock (*Conium maculatum*), showing upper portion of plant with flowers and seed, one-third natural size.

Character of the poison.—The characteristic poison of the hemlock is the well-known volatile alkaloid, conine, which is found in the seeds, and, especially at flowering time, in the leaves. The root is nearly harmless in March, April, and May, but is dangerous afterwards, especially during the first year of its growth. The poison hemlock is the most generally known poisonous plant historically, it being without much doubt the plant administered by the Greeks to Socrates and other state prisoners. Recent cases of poisoning have arisen accidentally from eating the seed for that of anise, the leaves for parsley, or the roots for parsnips; also from blowing whistles made from the ammonia. If superpurgation occurs, opium should be administered by a physician. In the case of two children, who were poisoned at Oakland, Cal., by eating a few seeds, ipecacuanha and *Veratrum viride* were administered with good effect. In cases of skin poisoning a wash of an alcoholic solution of sugar of lead (lead acetate) should be tried.

SNOW ON THE MOUNTAIN.

Euphorbia marginata Pursh.

Description and habitat.—An annual plant 2 to 4 feet high, differing most conspicuously from the preceding species in its more flexuous and less branching habit, and in having its upper leaves broadly margined with white. Its general aspect is far more pleasing to the eye, and on this account it is more frequently gathered for decorative purposes. This spurge is a native weed of the Great Plains from Montana to Mexico, and is spreading eastward rapidly to Louisiana and through southern Minnesota and Missouri to Wisconsin, Illinois, and Indiana. It is cultivated considerably for ornament, especially in the Northern Atlantic States, where it has frequently escaped from cultivation. It has recently been introduced as a weed into Germany.

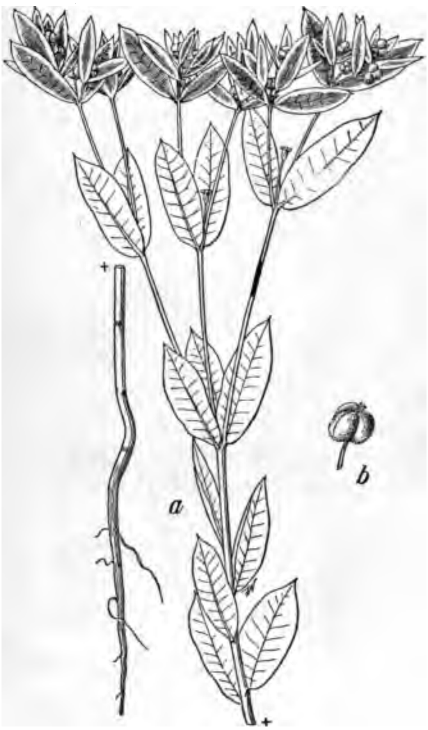

FIG. 16.—Snow on the mountain (*Euphorbia marginata*): *a*, whole plant, one-third natural size; *b*, seed capsule, natural size.

Poisonous property.—The poison of this plant reaches the stomach so far as known only through the eating of honey derived from its flowers. Large quantities of fall honey are annually made unsalable in localities where the plant grows in great abundance. The honey is hot and disagreeable to the taste, but does not appear to be a very serious poison, its effects being confined mostly to vomiting and purging. The milky juice when applied to the skin very often causes an itching inflammation, accompanied by pimples and blisters which last for several days. The general effect is much like that observed in rhus poisoning, for which it is sometimes mistaken. This blistering action is, in fact, so decided that a few stock raisers in Texas use the juice to brand cattle, it being held by them to be superior to a red-hot iron for that purpose because *the scar heals* more satisfactorily.

The large flowering spurge (*E. corollata*) and the ipecac spurge (*E. ipecacuanhae*) produce the same effect as the above species, but not so frequently and only to a minor degree. The effect of all is to be counteracted in the same way as the effect of the caper spurge. Children should be especially warned against handling them.

SUMAC FAMILY (ANACARDIACEAE).

POISON IVY, POISON OAK, AND POISON SUMAC.

Rhus.

Woody perennials, with alternate, mostly compound leaves and small greenish-white or yellowish flowers. All the well-known species with an upright terminal cluster of colored fruit are harmless.

POISON IVY.

Rhus radicans L.

Other names: Poison oak; poison vine; three-leafed ivy; poison creeper; mercury or markry (N. H. and N. J.); black mercury (Me.); markweed (Me.); pickry (Me.). (Fig. 17.)

Description and habitat.—A climbing or trailing shrub (sometimes erect), with variable threefoliate leaves, aerial rootlets, and greenish flowers, appearing in May and June. The smooth, waxy fruit often remains on the plant until late in winter. The leaves often resemble those of the box elder, as in the figure; but their margin is not seldom almost entire. They differ from those of the Virginia creeper in having only three leaflets instead of five. Poison ivy grows everywhere in open brush, in ravines, and on the borders of woods, and it is spread along roadsides and cultivated fields from seeds carried by crows, woodpeckers, and other birds that feed upon its fruit in winter. The plant occurs abundantly throughout the United States as far west as eastern Texas, eastern Kansas, and Minnesota, and in greater or less abundance throughout the less arid region of the West, with the exception of California, where it appears to be entirely replaced by *Rhus diversiloba.*

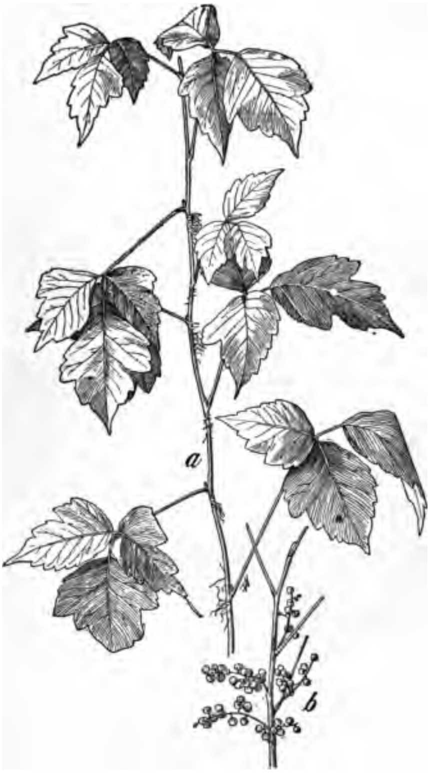

FIG. 17.—Poison ivy (*Rhus radicans*): *a*, spray showing aerial rootlets and leaves; *b*, fruit—both one-fourth natural size.

generally less severe than in animals. Respiratory stimulants, such as atropine and strychnine, should be given as antidotes by competent medical authorities. Oil, melted lard, or fat from bacon may be administered to animals by anyone with hopes of saving life, especially if offered when the symptoms are first noted. As a chemical antidote to be tried by physicians in cases of human poisoning, the writer suggests the internal use of a 1 per cent alkaline solution of permanganate of potash.

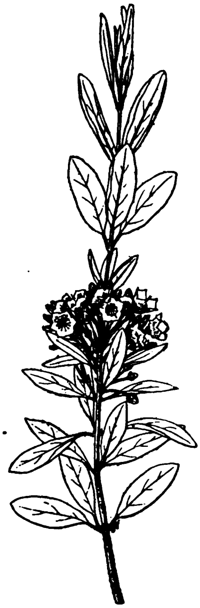

FIG. 25. — Narrow-leaf laurel (*Kalmia angustifolia*), showing flowering branch, one-third natural size.

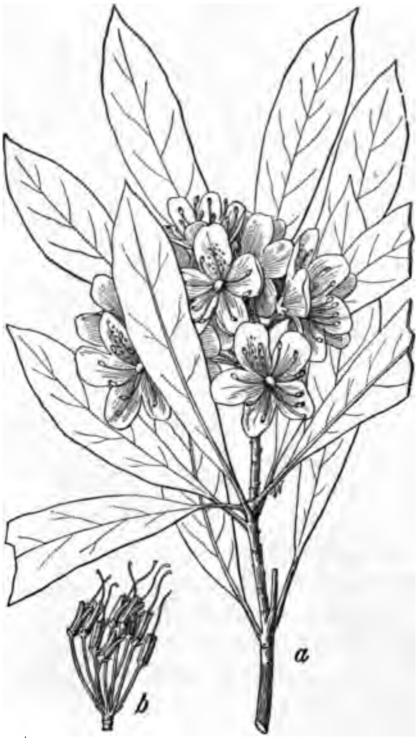

FIG. 26.—Great laurel (*Rhododendron maximum*): *a*, flowering branch; *b*, fruiting capsules—both one-third natural size.

The broad-leaf laurel is typical in its effects of a half dozen or more native species of the heath family. They are all poisonous in the same way, because they all contain the same toxic substance, andromedotoxin. Many fatalities are recorded against the following:

NARROW-LEAF LAUREL.

Kalmia angustifolia L.

Other names: Sheep laurel; lambkill; sheep poison; lamb laurel; dwarf sheep laurel; small laurel; low laurel; dwarf laurel; wicky. (Fig. 25.)

Description and habitat.—Like the preceding, but smaller, only 2 to 4 feet high, with smaller, thinner, and narrower leaves, and smaller flowers clustered not at the extreme end of the stem, but at the base of the fresh shoots. It is abundant at low altitudes in both dry and wet soils from Maine to New Jersey; less abundant westward throughout the Great Lakes region and southward to Tennessee and South Carolina.

GREAT LAUREL.

Rhododendron maximum L.

Other names: Laurel (south of Pa.); rosebay; mountain laurel; rhododendron; wild rosebay; American rosebay; big laurel (Pa.); big-leaf laurel (Pa.); horse laurel (Pa.); deer tongue; cow plant (Vt.); spoon hutch (N. H.). (Fig. 26.)

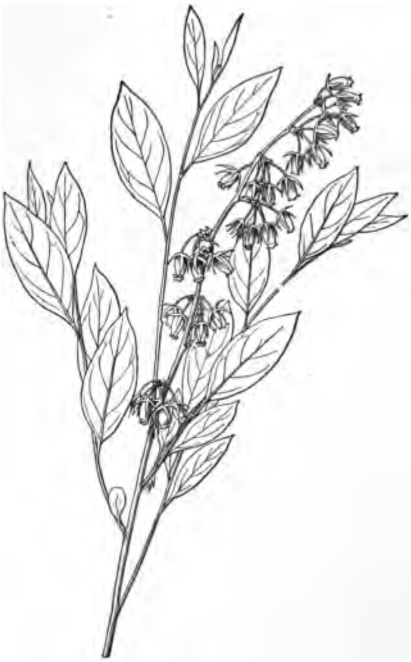

FIG. 27.—Stagger-bush (*Pieris mariana*), showing flowering branch, one-third natural size.

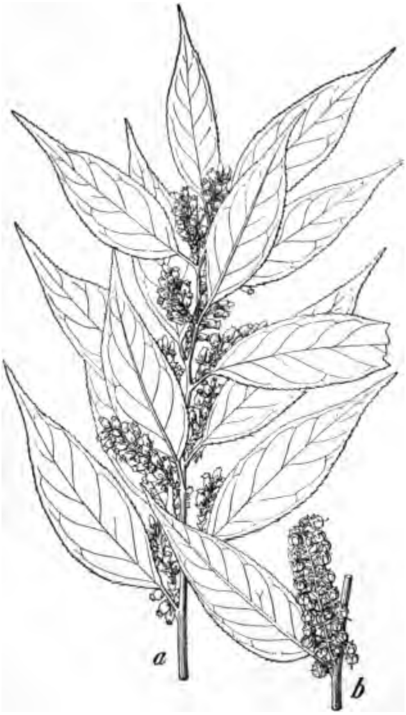

FIG. 28.—Branch ivy (*Leucothöe catesbaei*): *a*, flowering branch; *b*, fruiting capsules.

Description and habitat.—A large evergreen bush or small tree, 10 to 20 or 30 feet high, with thick leaves, 4 to 10 inches long, and splendid clusters of large, inodorous pale pink or nearly white flowers, blossoming in July. A commonly cultivated ornamental tree, native to the Alleghany Mountains, but extending northward in isolated patches to Connecticut and New Hampshire.

STAGGER BUSH.

Pieris mariana (L.) Benth. & Hook.

Other name: Kill lamb. (Fig. 27.)

Description and habitat.—A weak-limbed deciduous shrub, 2 to 4 feet high, with thick conspicuously veined leaves and showy clusters of tubular white flowers. It is frequent in low, damp soils near the coast from Connecticut to Florida.

BRANCH IVY.

Leucothöe catesbaei (Walt.) A. Gray.

Other names: Hemlock; calf kill; leucothöe; dog laurel. (Fig. 28.)

Description and habitat.—An evergreen shrub, 2 to 4 feet high, with thick, tapering, sharply saw-edged leaves and numerous axillary and terminal clusters of small white, tubular, ill-smelling flowers, which appear in April or May. It grows abundantly, often forming dense thickets along stream banks in the Alleghany Mountains from West Virginia to northern Georgia.

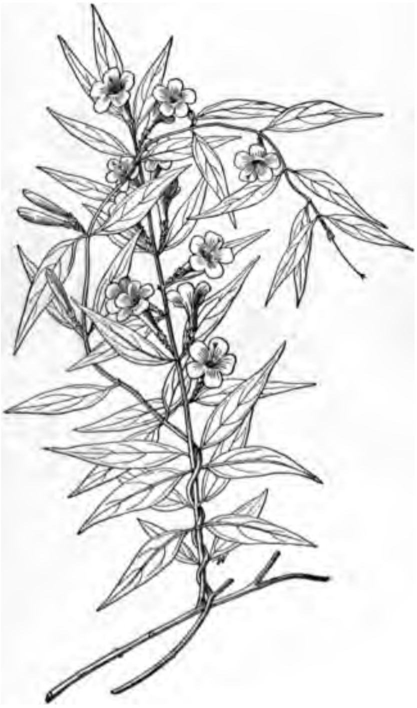

FIG. 29.—False jessamine (*Gelsemium sempervirens*), showing flowering spray, one-third natural size.

LOGANIA FAMILY (LOGANIACEAE).

FALSE JESSAMINE.

Gelsemium sempervirens L.

Other names: Yellow jessamine; yellow jessamine of the South; wild jessamine; Carolina jasmine; woodbine; Carolina wild woodbine; evening trumpet-flower. (Fig. 29.)

Description and habitat. — A woody vine, often climbing over shrubbery and trees to the height of 30 feet or more. It has small, evergreen leaves and large, fragrant, yellow flowers, 1 to 1½ inches long, which appear in March and April. It grows in woods and low grounds, from eastern Virginia and southern Tennessee to the Gulf, and southwestward into Mexico. The false jessamine belongs to a family from which, in other regions, strychnine and the dreaded arrow poison, curare, are obtained. Another species of the same genus, *G. elegans*, is said to have been formerly used at Hongkong to put criminal offenders to death.

Poisonous element.—A poisonous alkaloid, gelsemine, is found in the bark of the root of the false jessamine, and it probably exists also in the leaves and flowers. The root is used largely in medicine, and poisoning has been caused many times by overdoses and by mistaking the drug for other household remedies. Accidental cases seldom happen in the field, either with man or animals. One alleged case is, however, especially worthy of mention. Three persons died at Branchville, S. C., in 1885, supposedly from the effects of honey derived from the jessamine. The medical journals, in reporting the case, stated that a large quantity of gelsemine was found in a sample of the honey used, and this has been generally accepted as a fact. Special inquiry made by the Division of Botany has, however, revealed the fact that the honey was not subjected to chemical analysis, and that the diagnosis was based entirely upon the symptoms. Such conclusions are indefinite, and since no similar fatalities have subsequently been noted, the real cause of the above case is still an open question.

Symptoms and remedy.—The symptoms produced by overdoses are nausea, with ineffective attempts to vomit, pain in brows and eyeballs, dimness of vision, double vision, a pronounced weakness of the muscles, staggering, suffocation, and death by paralysis of the lungs. Immediate and permanent relief has been obtained by the use of a strong current of electricity. The symptoms have also been offset by the professional use of wild hemlock (*Conium maculatum*) and atropine. The stomach pump and coffee are effective when used in conjunction with whisky. Artificial respiration should be maintained throughout the treatment.

POTATO FAMILY (SOLANACEAE).

JIMSON WEEDS.

Datura.

Description and habitat.—Rank, ill-smelling plants, with large funnel-shaped flowers and prickly four-valved seed pods. They are mostly weeds which have been introduced into the United States from Europe and tropical America.

JIMSON WEED.

Datura stramonium L.

Other names.—Jamestown weed; common stramonium; thorn apple; apple of Peru; devil's apple; mad apple; stinkwort; stinkweed (W. Va.); Jamestown lily (N. C.); white man's plant (by Indians). (Fig. 30.)

Description and habitat.—A stout, smooth, bushy annual 2 to 5 feet high, with a coarse green stem, large flaccid leaves, and white, heavy-scented flowers 2 to 4 inches long. The flowers appear from May to

LANE LIB

September, and the fruit ripens from August to November, according to latitude. The seeds are numerous and about the size of a grain of buckwheat. When fresh they are ill-scented and nauseating, but later they are not so disagreeable. The nectar is sweet, but a little nauseating. The jimson weed is native to Europe and Asia, but is now quite commonly introduced in waste grounds about dwellings in all of the States east of Iowa and Louisiana with, perhaps, the exception of Minnesota. It is common in eastern Kansas and Nebraska, in some parts of Colorado, and has probably obtained some foothold in all of the Western States.

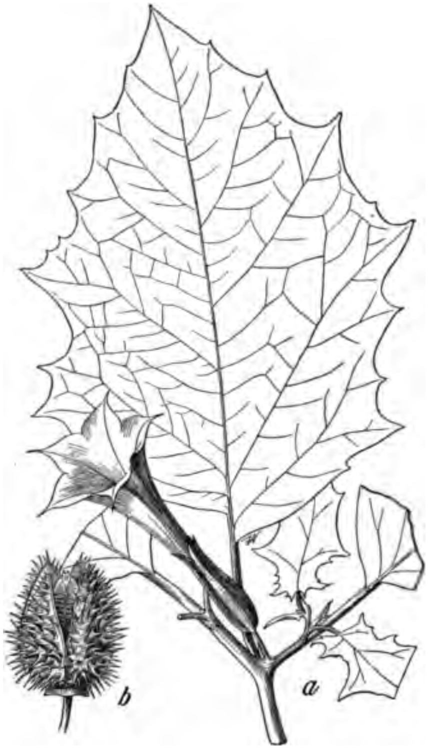

FIG. 30.—Jimson weed (*Datura stramonium*): *a*, flowering spray; *b*, fruiting capsule—both one-third natural size.

JIMSON WEED.

Datura tatula L.

Other names: Jamestown weed; purple thorn apple; common stramonium; thorn apple; mad apple; stinkroot; stinkweed.

Description and habitat. — A somewhat taller plant, with purplish flowers and stems, but otherwise practically identical with the preceding, both in botanical and toxic characters. Geographically, it is more abundant toward the South and West than the other.

Poisonous elements.—The poisonous alkaloids, atropine and hyoscyamine, the active constituents of belladonna (*Atropa belladonna*), are found also in both of the jimson weeds. Hyoscyamine is the poison of the henbane (*Hyoscyamus niger*), and as it is identical in its physiological action with atropine, the above-named plants present the same symptoms of poisoning, which must be met in the same manner. The alkaloids exist in all parts of the two daturas. The seeds are especially poisonous.

How poisoning is produced.—Cases of poisoning arise in adults from excessive use as a stimulant or as a medicine. Children are sometimes tempted to eat the fruit, if they are permitted to play where the weed is to be found. Several cases of this kind were reported to the Department during the fall of 1897. At Alpena, Mich., five children were badly poisoned in August by eating the seeds of the purple-flowered species, which was cultivated in a garden as a curiosity under the fanciful trade name of "Night-blooming Cactus." In September a boy was killed in New York by eating the seeds of the jimson weed, which was permitted to grow in a vacant lot; his brother poisoned at the same time was saved only with difficulty. In October two other cases occurred in New York. Four children were playing in one of the public parks of the city where jimson weeds were growing luxuriantly. The boys imagined themselves Indians and roamed about and ate parts of various plants. Three of them ate the seeds of the jimson weed. One died in a state of wild delirium; another was saved after heroic treatment with chloral hydrate and morphine; the third, who ate but few of the seeds, was but little affected. Children are also poisoned by sucking the flower, or playing with it in the mouth. The fresh green leaves and also the root have occasionally been cooked by mistake for other wild edible plants. One or two instances are recorded in which cattle have been poisoned by eating the leaves of young plants which were present in grass hay, but these animals generally either avoid the plants or are very resistant to its poison.

Symptoms and treatment.—The symptoms of the poisoning are about the same in all cases, those characteristic of large doses being headache, vertigo, nausea, extreme thirst, dry, burning skin, and general nervous confusion, with dilated pupils, loss of sight and of voluntary motion, and sometimes mania, convulsions, and death. In smaller amounts the effects are like those of the ordinary narcotics. As vomiting is not a common symptom, the contents of the stomach must be quickly removed by the use of the stomach tube or emetics. It is well then to wash out that organ thoroughly with strong tea, tannic acid, or an infusion of oak bark, and to administer stimulants, such as brandy and hot, strong coffee. Pilocarpine is recommended by physicians to counteract the drying effect upon the secretions (licorice is very useful), and prolonged artificial respiration must often be resorted to to maintain the aeration of the blood.

Datura meteloides is a very large-flowered species, which is native from southern California to Texas, and in some localities is common in cultivation. No cases of poisoning have yet been recorded against it, but it is largely used as an intoxicant by Indians, and is used in general for the same purposes as jimson weed. It undoubtedly contains the same poisons.

The jimson weeds should be removed from the vicinity of dwellings and from play grounds by mowing the plants down while in flower or by cultivating the soil.

NIGHTSHADES.

Solanum.

Annual or perennial herbs or shrubs with 5-lobed wheel-shaped corollas; stamens protruding in the form of a cylinder, loosely coherent at the apex; and a fleshy fruit or berry containing numerous flat seeds.

BLACK NIGHTSHADE.

Solanum nigrum L.

Other names: Common nightshade; nightshade; deadly nightshade; garden nightshade. (Fig. 31.)

Description and habitat.—A smooth annual, 1 to 2 feet high, with rough-angular, widely branching stems; ovate leaves, 2 to 4 inches long, with wavy margins; drooping clusters of small white flowers, and black, globose, juicy berries, which ripen from July until September or October. The black nightshade is a common introduced weed, in rich, shaded grounds and fields in all parts of the United States east of South Dakota and Arkansas, and in wet or damp places westward to the Pacific Ocean.

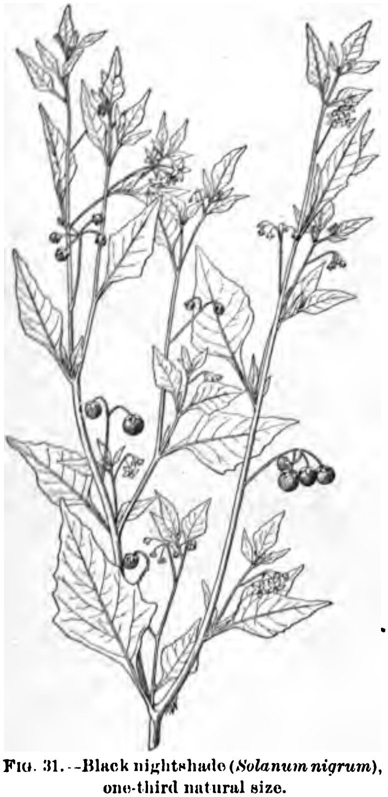

FIG. 31.—Black nightshade (*Solanum nigrum*), one-third natural size.

Poisonous properties.—Solanine, a crystalline alkaloid-like compound, is present in all parts of the plant, including the ripe berry. It is not classed as one of the most violent poisons, but nevertheless it is decidedly active in sufficient quantities. It is not destroyed by boiling water. The amount of solanine present in any given part of the plant is not constant, but varies with the conditions of growth. The more musky-odored plants are considered to be the most poisonous. In some the amount of alkaloid present in the ripe fruit and leaves is so small that these parts may be, and are, consumed in considerable quantity without any ill consequences. Poisoning does sometimes follow, but it is not clear whether this is due to improper preparation or to careless selection of the parts used. In Europe cases of human poisoning are said to occur in infants over whom the plants are hung to induce sleep. The use of black nightshade either for food or for the latter purpose is certainly not to be recommended without much caution. Cattle seldom eat the plant, but cases of poisoning are recorded for calves, sheep, goats, and swine.

Symptoms and remedies.—The characteristic symptoms are about the same in man and in animals. They are: Stupefaction; staggering; loss of speech, feeling, and consciousness; cramps, and sometimes convulsions. The pupil is generally dilated. Death is directly due to a paralysis of the lungs, but fortunately few cases are fatal. The antidotes to be used are the same as for belladonna, viz, emetics, cathartics, and stimulants, such as whisky, wine, or strong coffee. An alkaline drink, such as a solution of ordinary washing soda, is strongly recommended.

The plants may easily be killed by cutting them down before the fruit matures.

BITTERSWEET.

Solanum dulcamara L.

Other names: Woody nightshade; bittersweet nightshade; wolf grape; violet bloom; scarlet berry; nightshade vine; garden nightshade; staff vine; fever twig; tetonwort. (Fig. 32.)

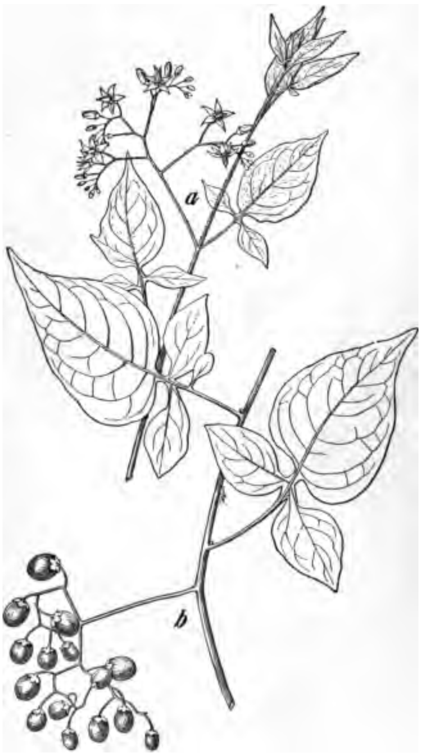

FIG. 32.—Bittersweet (*Solanum dulcamara*): *a*, flowering spray; *b*, fruit—both one-third natural size.

Description and habitat.—A climbing, woody, introduced perennial 3 to 6 or 8 feet high, with thin leaves, the lowermost of which are ovate or heart-shaped, the upper more or less spear-shaped. The flowers are purple, the fruit red. It ripens from July to October and November. The plant thrives best and is common along brooks and ditches from Massachusetts to Ohio, less common elsewhere in damp ground from Maine to North Carolina and westward to Wisconsin and Missouri.

Poisonous properties and treatment.—Besides solanine, this plant contains another less poisonous compound, dulcamarin, which gives it its peculiar bitter-sweet taste. Neither of the compounds is abundant. The berry, though its taste is not remarkably disagreeable, is somewhat poisonous, and it has been shown that an extract of the leaves is moderately so. The plant has nevertheless caused some ill effect. The treatment is the same as in case of the above species.

SPREADING NIGHTSHADE.

Solanum triflorum Nutt.

Other name: Wild potato. (Fig. 33.)

Description and habitat.—A smooth, low annual, with rough, angular, widely branching stems, 7 to 9-lobed leaves, numerous clusters of small white flowers which are grouped in threes, and large green berries a half inch or more in diameter. A native of the Great Plains, formerly found especially in "prairie-dog villages," now a garden weed, from Arizona and Texas to British America.

Poisonous character.—Complaints of the poisoning of cattle have been sent in to the Department from Nebraska, and experiments on guinea pigs show that berries sent in from that State are poisonous. No human cases have been reported. The berry is not attractive to the eye, but has an agreeable odor and taste. It is therefore to be suspected in cases of poisoning which occur in localities where the weed is abundant. The active constituent is undoubtedly some compound of solanine.

The plants may be killed by cultivating the soil and cutting them down before the seeds are fully grown. The common potato (*Solanum tuberosum*) is a member of this group. There is little solanine present in it ordinarily, but it does exist in considerable quantity in tubers that are green from exposure to the sun and air, and in old ones after sprouting. Several cases of poisoning are recorded, but even in old potatoes the poison is ordinarily extracted by the water which is thrown away from them after boiling. The green fruits have caused death.

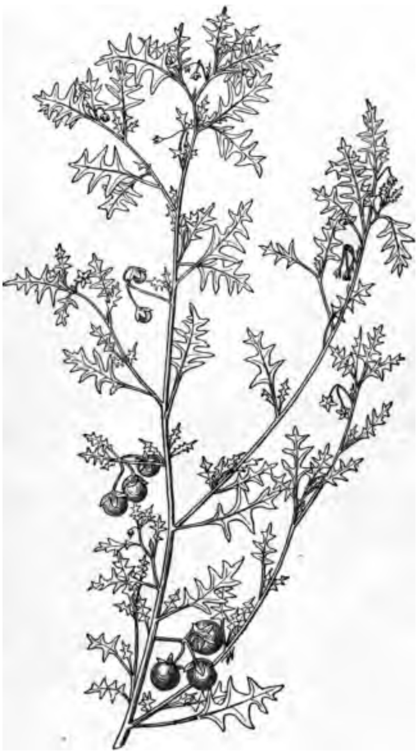

FIG. 33.—Spreading nightshade (*Solanum triflorum*), one-third natural size.

SUNFLOWER FAMILY (CARDUACEAE).

SNEEZEWEED.

Helenium autumnale L.

Other names: Sneezewort; autumn sneezewort; autumn sneeze-weed; staggerweed (S. C.); swamp sunflower; false sunflower; ox eye; yellow star. (Fig. 34.)

Description and habitat.—A smooth, angular, branching perennial, 1 to 3 feet high, with rather thick, lance shaped leaves, and a large number of showy yellow flowers which do not appear until autumn. It grows commonly in moist ground from Connecticut to Michigan and Illinois, and southward to the Gulf; less commonly northwestward from Louisiana to Oregon and Washington; also in Arizona. It has been found at an altitude of 6,000 feet in Nevada.

Character.—The whole plant, especially the flower, is bitter and more or less acrid and pungent. The powdered plant causes violent sneezing when inhaled, and it is therefore used in medicine to produce that effect. Sheep, cattle, and horses that are unfamiliar with the plant are often poisoned by it when driven to localities where it is abundant. As a rule these animals avoid it, but it is said that they sometimes develop a taste for it and are quickly killed by eating it in large quantity.

Poisonous constituent.—The poisonous constituent has not been closely investigated, but it is known that it exists principally in the flowers. The young plants appear to be only very slightly dangerous. In the mature ones the amount of poison present seems to vary greatly even in the same field.

Symptoms and remedy.—The symptoms, as determined by experiments made in Mississippi upon calves, are an accelerated pulse, difficult breathing, staggering, and extreme sensitiveness to the touch. In fatal cases, death is preceded by spasms and convulsions. Melted lard has been used with good effect in offsetting the action of the poison when given before the spasms began.

Sneezeweed may be best kept in check by cultivating the ground or by mowing the plants down before the time of flowering.

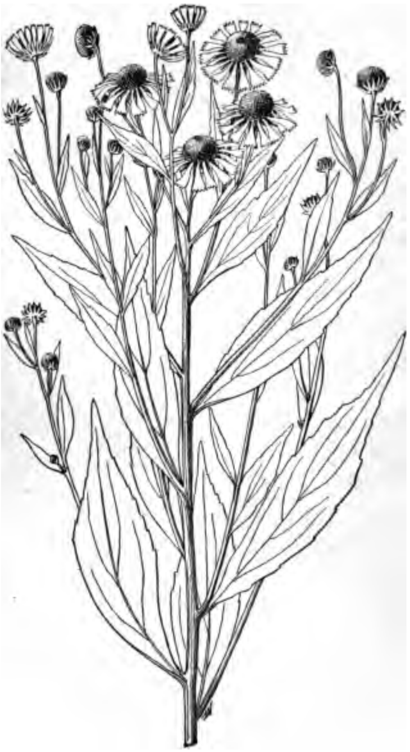

FIG. 34.—Sneezeweed (*Helenium autumnale*), one-third natural size.

Over twenty kinds of sneezeweed occur in the United States, but only one additional species is strongly suspected of poisoning animals in the field. This is the bitterweed of the Gulf States (*H. tenuifolium*). One instance is recorded where several individuals were poisoned by eating bread contaminated with its seeds. These were thrashed with the wheat in which the plants were growing, and were not removed therefrom before its being converted into flour. The plant is conceded by many to be an indirect source of bitter milk and bitter meat in cases where cattle have fed upon it.

INDEX.

[Page numbers in italics indicate headings.]

Page.
Aconite ... *22*, 23
Aconitum columbianum ... *22*, 23
  napellus ... 17
Aesculus californica ... 40
  glabra ... 39
  hippocastanum ... 39
  pavia ... *39*
Agaricaceae ... *11*
Agaric, fly ... 12
Agaricus campestris ... 13
Agrostemma githago ... *21*
Alsinaceae ... *21*
Amanita ... *11*
  bulbous ... 14
  caesarea ... 12
  deadly ... 12
  false orange ... 12
  fly ... *12*, 13, 14
  muscaria ... *12*
  orange ... 12
  phalloides ... 13, *14*, 15
Amanita, poison ... 14
  verna ... 16
  vernal ... 16
Amanitas, deadly ... *11*
Anacardiaceae ... *35*
Anagallis arvensis ... 10
Anti-gopher plant ... 33
Apiaceae ... *40*
Apple of Peru ... 49
Aragallus lambertii ... *30*
Astragalus molissimus ... *29*
Ash, poison ... 36
Atropa belladonna ... 50
Bastard nigelle ... 21
Bear corn ... 16
Beaver poison ... 40
Bittersweet ... *53*
  nightshade ... 53
Branch ivy ... 47, *48*
Buckeye ... 39
  California ... 40
  family ... *39*
  red ... *39*
  small ... 39
Bugbane ... 16
Bunch-flower family ... *16*
Caesalpiniaceae ... *28*
Calf kill ... 48
Calico bush ... 44
Caltha palustris ... 17

Page.
Caper bush ... 33
  wild ... 33
Carduaceae ... *54*
Carrot family ... *40*
Cashes ... 43
Cherry ... 27
  black ... *26*, 27
  rum ... 26
  whiskey ... 26
  wild ... 26
  wild black ... 26
Chicot ... 28
Children's bane ... 40
Cicuta ... 9, 41
  bulbifera ... 42
  bolanderi ... 42
  maculata ... *40*
  vagans ... *41*
  virosa ... 40, 42
Clover, crimson ... 10
Cockle ... 21
Cocklebur ... 10
Coffee tree ... 28
Colorado loco vetch ... 30
Conium maculatum ... 42, *43*, 49
Convallariaceae ... *18*
Convallaria majalis ... *18*
Corn cockle ... *21*
Cowbane ... 40
  spotted ... 40
Cow plant ... 47
Cow poison ... 25
Crazy weed ... 29, 30
Crotalaria sagittalis ... *31*
Croton setigerus ... 32
  tiglium ... 32
Crowfoot family ... *22*
Crown of the field ... 21
Crow poison ... 16
Cypripedium ... *19*
  hirsutum ... 19, *20*
  parviflorum ... *20*
  reginae ... *19*
Cytisus laburnum ... 28
Daphne mezereum ... 10
Datura ... 49
  meteloides ... 51
  stramonium ... *49*
  tatula ... *50*
Death cup ... 13, *14*, 15
Death of man ... 40

Page.

- Deer tongue 47
- Delphinium *23*
  - consolida 24
  - decorum 25
  - geyeri *24*
  - menziesii *25*, 26
  - recurvatum *25*
  - scopulorum 25
  - staphisagria 24
  - tricorne *24*
  - trolliifolium *25*
- Devil's apple 49
- Devil's bite 16
- Digitalis 22
  - purpurea 10, 18, 22
- Dog's mercury 32
- Dogwood, poison 36
- Ducks 19
- Ducksretter 16
- Earth gall 16
- Elder 10
  - poison 36
- Ergot 10
- Ericaceae *44*
- Euphorbia *32*
  - corollata 35
  - ipecacuanhae 35
  - lathyris *33*
  - marginata 32, *34*
- Euphorbiaceae *32*
- Evening trumpet flower 48
- False jessamine 48
- Fever twig 53
- Fly killer 12
- Foxglove 10
- Fungi, gill *11*
- Fungus, fly 12
- Friar's cap 22
- Gaultheria procumbens 45
- Gill fungi *11*
- Gelsemium sempervirens *48*
- Gleditsia triacanthos 28
- Glycosma ambigua 42
- Gopher plant 33
- Gymnocladus dioica *28*
- Heath, family *44*
- Helenium autumnale *54*, 55
- Hellebore, American white 16
  - American false *16*
  - false 16, 17
  - swamp 16
  - white 16, 17
- Hemlock 43, 48
  - poison 42, *43*
  - spotted 40
  - wild 40
- Herb bennet 43
- Hippomane mancinella 32
- Honey locust 28
- Horse-chestnut 39
- Hyoscyamus niger 50
- Indian shoe 20
- Itch weed 16
- Iron hat 22
- Ivy 20, 44
  - *big* 44

Page.

- Ivy, big-leaved 44
  - branch 47, *48*
  - bush 44
  - poison 9, *35*, 44
  - three-leaved 35
  - wood 44
- Jamestown weed 49, 50
- Jamestown lily 49
- Jasmine, Carolina 48
- Jatropha stimulosa 32
  - urens 32
- Jessamine, false *48*
  - wild 48
  - yellow 48
  - yellow of the South 48
- Jimson weed *49*, *50*
- Jimson weeds *50*
- Kalmia 44
  - angustifolia *46*
  - latifolia *44*
- Kentucky coffee tree *28*
- Kentucky mahogany 28
- Kill lamb 48
- Laburnum tree 28
- Labrador tea 10
- Lady's slipper 20
  - larger yellow 19, *20*
  - showy *19*
  - smaller yellow *20*
  - yellow 20
- Lady's slippers *19*
- Lambkill 46
- Larkspur *24*, *25*
  - dwarf *24*
  - purple *25*
- Larkspurs *23*
- Laurel 47
  - American 44
  - big 47
  - big-leaf 47
  - broad-leaf *44*, 45, 46
  - dog 48
  - dwarf 46
  - dwarf sheep 46
  - great 46, *47*
  - high 44
  - horse 47
  - lamb 46
  - low 46
  - mountain 44, 47
  - narrow-leaf *46*
  - poison 44
  - rose 44
  - round-leaf 44
  - sheep 44, 46
  - small 44, 46
  - wood 44
- Ledum groenlandicum 10
- Lepiota naucina 15
  - smooth 15
- Leucothöe 48
  - catesbaei 47, *48*
- Licheta 21
- Ligusticum scoticum 42
- Lily of the valley *18*
  - family *18*

Page.
- Loco weed 9, 29, 30
  - stemless *30*
  - woolly *29*
- Loganiaceae *48*
- Logania family *48*
- Mad apple 49, 50
- Markry 35
- Markweed 35
- May blossom 18
- May lily 18
- Melanthaceae *16*
- Mercurialis perennis 32
- Mercury 35
  - black 35
- Mezereon 10
- Moccasin flower 19, 20
  - yellow 20
- Mole plant 33
  - tree 33
  - weed 33
- Monkey flower 20
- Monkshood 22
- Mullein pink 21
- Mushroom 11
  - common 13
  - meadow 13
- Muskrat weed 40
- Musquash root 40
- Narcissus 10
- Nerium oleander 10
- Nerve root 19, 20
- Nervine 20
  - female 19
  - male 20
- Nightshade 52
  - black *52*
  - common 52
  - deadly 52
  - garden 52, 53
  - spreading *53*
  - vine 53
  - woody 53
- Nightshades *51*
- Oenanthe sarmentosa 42
- Old maid's pink 21
- Oleander 10
- Orchid family *19*
- Orchidaceae *19*
- Ox eye 54
- Papilionaceae *29*
- Parsley, spotted 40, 43
- Pea family *29*
- Physic nut, Brazilian 32
- Pickry 35
- Pieris mariana 47, *48*
- Pimpernel 10
- Pink family *21*
- Plum 27
  - family *26*
- Poinsettia 32
- Poison ash 36
  - creeper 35
  - elder 36
  - hemlock 42, 43
  - ivy 9, *35*
  - ivy, poison oak, poison sumac *35*

Page.
- Poison oak 35, *36*
  - root 43
  - sumac 35, *36*
  - vine 35
  - wood 36
- Poke, Indian 16
  - meadow 16
  - root 16
- Potato family *49*
- Prunaceae *26*
- Prunus, caroliniana 27
  - laurocerasus 27
  - serotina *26*, 27
  - virginiana 27
- Puppet root 16
- Queue des rats 42
- Ranunculaceae *22*
- Rattlebox *31*
- Rattleweed 31
- Rhododendron 47
  - maximum *47*
- Rhus 20, *35*
  - diversiloba 35, *36*
  - radicans 20, *35*, 36
  - vernix *36*
- Ricinus communis 32
- Rosebay 47
  - American 47
  - wild 47
- Rose campion 21
- Sambucus canadensis 10
- Sapindaceae *39*
- Scarlet berry 53
- Senna family *28*
- Sheep poison 46
- Sleepy grass 10
- Slipper root 20
- Snakeweed 40
  - poison 43
- Sneezeweed *54*, 55
- Sneezewort 54
  - autumn 54
- Snow on the mountain *34*
- Solanaceae *49*
- Solanum 51
  - dulcamara *53*
  - nigrum *52*
  - triflorum *53*
  - tuberosum 54
- Spoon hunt 44
- Spoon hutch 47
- Spoonwood 44
- Springwort 33
- Spurge, caper *33*
  - family *32*
  - garden 33
  - myrtle 33
  - nettle 32
- Spurges 32
- Staff vine 53
- Stagger bush 47, *48*
- Staggerweed 24, 54
- Stinkroot 50
- Stinkweed 43, 49, 50
- Stinkwort 49
- Stipa viridula robusta 10

Page.

Storm hat, 22
Stramonium, common, 49, 50
Sumac family, *35*
  poison, 35, *36*
  poison swamp, 36
  swamp, 36
Sunflower, false, 54
  family, *54*
  swamp, 54
Sweet cicely, Oregon, 42
Teton wort, 53
Thorn apple, 49, 50
  purple, 50
Thunderwood, 36
Toadstool, 11
Tragia nepetaefolia, 32
Trumpet flower, evening, 48
Umbil, yellow, 20
Umble, 20
Uncus, Indian, 16
Valerian, American, 20
Venus's cup, 20
Venus's shoe, 20
Veratrum album, 16, 17
  californicum, 18

Page.

Veratrum viride, *16*, 17
Violet bloom, 53
Water hemlock, 9, *40*, 41
  American, 40
  Oregon, *41*
Whip-poor-will shoes, 19
White man's plant, 49
Wicky, 44, 46
Wild celery, 42
Wild hemlock, 40
Wild pea, 30
Wintergreen, 45
Wode-whistle, 43
Wolf grape, 53
Wolfsbane, 16, 22
Wolf's milk, 33
Woodbine, 48
  Carolina wild, 48
Xanthium canadense, 10
  spinosum, 10
  strumarium, 10
Yellows, 20
Yellow star, 54
Yew, 9

○

LANE MEDICAL LIBRARY

To avoid fine, this book should be returned on
or before the date last stamped below.

JUL - 8 1963

MAR 1 2 1966

Gaylord Bros.
Makers
Syracuse N. Y.
PAT. JAN. 21, 1908

LANE MEDICAL LIBRARY OF
STANFORD UNIVERSITY
300 PASTEUR ROAD
PALO ALTO, CALIFORNIA

B1100
C51
1898

Chesnut, V. K. 9945
Principal poisonous pla
of the United States.

NAME	DAT

B1100
C51
1898

Chesnut, V.K. 9945
Principal poisonou
plants of the U.S.

NAME	DATE DUE
F. D. Fellows -	OCT 18 1929
M. Davis	
Iola Barber	JUL - 8 1963
	MAR 1 2 1966